BANK DATA SERVICE SUBSIDIARIES

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ABOUT INPUT

INPUT provides planning information, analysis, and recommendations to companies in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Professional staff have, on average, nearly 20 years experience in the information processing industry. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business prob

Formed in 1974, INPl ... ting firm. Clients include over 100 of th ... d companies.

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COMMERCIAL BANK

FINANCIAL AND ECONOMIC REMOTE COMPUTING

SERVICES SUBSIDIARIES

NOVEMBER, 1977

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I.   INTRODUCTION

I INTRODUCTION

- This report describes the major bank computer subsidiary, Interactive Data Corporation (IDC), offering financial and economic remote computing services, and the market framework in which IDC operates.

- The information and data contained in this report were obtained from on-site interviews with an executive of the Information Services Division, Chase Manhattan Bank, key executives of Interactive Data Corporation, from a prior Input Market Analysis Service (MAS) report on Remote Computing Services Markets for Economic and Financial Data Bases, and from the INPUT Company Analysis and Monitoring Program (CAMP) products and services file.

- Chapter II contains a summary analysis of the Chase/IDC goals and objectives; and INPUT's recommendations for Citibank concerning possible market entry.

- A detailed profile of Interactive Data Corporation including its relationship to its parent, Chase Manhattan Bank, is presented in Chapter III.

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- Chapter IV outlines the four (4) types of economic and financial data base related remote computing services which characterize the market of which Economic and Financial Remote Computing Services is the major segment. Market size is projected through 1981.

- The competitive environment in which IDC operates as the only major financial and economic computer services bank subsidiary is outlined in Chapter V.

- The marketing and technical requirements necessary for successful market entry by Citibank are presented in Chapter VI.

- Appendices A through E contain detailed IDC product and pricing literature, and descriptions of the leading vendors of Econometric Consulting Services, Financial and Economic Remote Computing Services, and data bases.

- The following terms are used throughout this report.

- Econometric Consulting Services (ECS)

    - Services provided in this category are characterized by the presence of high-level consultants (usually Ph.D.s) who provide clients with econometric models and mathematically sophisticated forecasting techniques to predict future and explain past economic activity.

    - ECS, in toto, may include subscriptions to printed services, proprietary econometric models, subscription to various data bases, and remote computing services (RCS). Typically, all of these items are billed separately.

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- Financial and Economic Remote Computing Services (FERC)

  - This service provides for the utilization of economic and
    financial data bases through remote computing services. The
    total service contains these elements: Predefined data base(s);
    software applications packages which may be industry specific;
    technical assistance. Client billings are comprised principally
    of data base subscription fees and remote computing services
    use charges.

- Data Base Subscription Services (DBS)

  - This service is based on the sale of the financial or economic
    information itself. DBS vendors obtain revenues by selling or
    renting their data bases directly to users, ECS vendors, and to
    FERC vendors. Much of these revenues are obtained from the
    sale of the data bases in printed form an on magnetic media
    for in-house computer use.

- Financial Inquiry Services (FIS)

  - This service provides on-line access to a wide range of security
    commodity, bond, money instrument, and option price data bases
    directly related to activity on national exchanges. The services
    include the data bases, remote computers, the communication
    network, communication controllers, and the inquiry terminals.
    Only three vendors participate in this market: Bunker-Ramo,
    Quotron and GTEIS.

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II.   SUMMARY AND RECOMMENDATIONS

II   SUMMARY AND RECOMMENDATIONS

A.   SUMMARY

- The market for financial and economic data base related remote computing services is very attractive. Total 1977 revenues for the four market segments defined in the Introduction are $184 million and will rise to $373 million by 1981.

- Interactive Data Corporation is the only major bank subsidiary offering services in the major segment, "Financial and Economic Remote Computing Services (FERC)". The FERC segment 1977 revenues are $66 million and will rise to $180 million by 1981.

- The "time-sharing" revenues for remote computing services related to data base usage is ten (10) times the revenues derived from data base subscription itself.

- IDC 1977 revenues are $22 million, 70% or 15 million of which is FERC related. IDC has grown at an average annual growth rate (AAGR) of 35% over the past three years and is contributing 17% of gross revenues to Chase profits.

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- Chase is the largest IDC user, contributing $4.5 million in 1977 revenues for both FERC and general timesharing usage. Chase gets a 40% discount from IDC.

- IDC's initial thrust was to offer financial data base and general timesharing services to the investment side of the financial market-place primarily in the Northeastern and New England states.

- In the past two (2) years IDC has shifted away from offering general timesharing services to a concentration on offering financial and economic planning services (including the services of Chase Econometrics) to corporate executives of the Fortune 500 Corporations. IDC has also greatly expanded its marketing organization and time-sharing network to cover major cities throughout the United States.

- IDC has expanded its FERC services to England and now Europe (Frankfurt). In addition, IDC has entered the international corporate funds transfer market through a newly acquired group, Financial Transactions Services, and through offering Chase's Info Cash International Services.

- The corporate activities of both IDC and Chase Econometric Associates (CEA) are coordinated by the Chase Manhattan Bank, Information Services Division. Chase intends to have IDC expand the variety of electronic services offered to the financial community and to corporate clients but remain in areas directly related to Chase's interests, money markets. Jack Arnow, IDC's President has complete autonomy in running the day-to-day company operations.

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- Chase does not intend to merge CEA and IDC. However, emphasis is being placed in greater cross marketing of IDC and CEA Services. The CEA data bases and models are currently available on both the IDC and ADP Network Services, Inc. time-sharing networks. The CEA agreement with ADP expires in 1978, and may not be renewed. In a similar vein Merrill Lynch Economics offers its data bases and econometric models on both the IDC and National CSS time-sharing networks, but may shift solely to National CSS in 1978.

- Chase management is pleased with IDC. Besides being a solid profit contributor, IDC being on the forefront of electronic technology enhances the "Chase First" image, particularly in international markets. Chase views itself as providing financial services to corporate clients and IDC (and CEA) providing information services to corporate planners, financial executives and money managers. Chase feels that the customers of Chase are the same as those of IDC.

- Chase management's policy is to keep IDC fairly autonomous in order to maintain the quality of the technical staff and access to the most advanced technology. They like the proximity of IDC to MIT and the high technology companies along route 128.

- Chase management considers Data Resources, Incorporated (DRI) and ADP Network Services the chief competitors to IDC. Chase feels that by closely coordinating the activities of CEA and IDC, IDC can offer the same full line of econometric and financial services as

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does DRI. Chase may decide that IDC would have superior product and services to those of ADP if CEA does not renew its marketing and services agreements with ADP.

• IDC views itself as "The Data Utility." One of IDC's strong points is that users can access all the IDC data bases in a uniform manner with any of IDC's programming languages. Users are willing to pay the otherwise higher costs to use the IDC time-sharing network to gain efficient access to the wide variety of economic and financial data offered by IDC.

• Another IDC strong point is the quality of the data contained in the IDC data bases. IDC uses a staff of 40 data consultants and data collection specialists to maintain the quality control of data entering each data base.

B. RECOMMENDATIONS

• Citibank and its corporate clients form a natural customer base to offer selected financial and economic data base related remote computing services. INPUT recommends that this base be considered a prime market area for initial market entry.

• In considering market entry, Citibank should investigate the availability of international data bases, both economic and industrial, which would

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differentiate the initial products offered from that of competition.
INPUT believes that such data bases coupled with efficient model
building software would find widespread use among both the multi-
national and export corporate community. Citibank should give
special attention to the international marketplace where significant
market penetration has not yet taken place.

- Another method of establishing unique products/services is to seek
  marketing agreements with experts (e.g.,A.D. Little) and with trade
  associations (e.g.,National Association of Real Estate Appraisers)
  who have specialized models and data bases with a small client base
  and who might want national coverage.

- There are only six to eight computer based econometric forecasting
  and economic consulting groups with national recognition. The three
  major ones, CEA, DRI and Merrill Lynch Economics, all use aggregate
  models containing 300 or more variables. INPUT recommends that
  Citibank seek a consulting group having a monetarist model with good
  interest rate structure forcasting capability. One such group is
  the Applied Financial Economics Center (AFEC) headed by Dr. A. James
  Meigs, a former Citibank economist.

- Most FERC vendors target their services to the Fortune 500 U.S.
  corporations and the equivalent size banks, savings and loans and
  other financial intermediaries. Citibank could reach down to the
  Fortune 1000 companies and their financial equivalents by a combination
  of reduced timesharing costs and reduced data base fees by data base

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sub-sector aggregation. Reduced timesharing costs could be structured under the concept of transaction pricing as contrasted to the current method of timesharing resource pricing which makes the budgeting process for the less sophisticated user very difficult. Reduced time-sharing costs can also be obtained by efficient sorting techniques (needed for aggregating data bases and exercising models), improved access techniques (selection of time series) and cheaper file storage. A 40% overall cost reduction would bring FERC services to a much wider (Fortune 1000) marketplace than is currently penetrated by competitors.

- IDC uses IBM equipment and its time charge rate structure is extremely high in comparison to most other major time-sharing vendors. Citibank, with DEC equipment, should be able to compete effectively on price.

- The Investment, Economic, and Corporate Planning groups in Citibank are an additional source of software products to offer when making market entry. Many of the services that Citibank offers free to its clients could be translated to RCS revenues if the corporate clients were advised that they could conduct independent analyses using the same software products which Citibank itself uses.

- Less than 5 years ago money managers priced investment portfolios once a month either manually or by using pricing magnetic tapes from such firms as Telestat. Within the last several years, many portfolio managers were able to price portfolios on a weekly basis through either magnetic tape or data base related remote computing services. IDC now offers money managers daily portfolio pricing with prices as

of the last days close of business. This progression is indicative
of the financial markets trend toward real-time. Three Financial
Inquiry Services (FIS) vendors offer real-time access via interactive
terminal networks to national money market data. INPUT recommends
that Citibank investigate a real-time approach to financial and
economic data base related computing services. Early market entry
could be accomplished by acquisition of Quotron Systems which has the
most advanced technology of the competing vendors.

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III.   INTERACTIVE DATA CORPORATION

III. INTERACTIVE DATA CORPORATION

A. HISTORY AND BACKGROUND

● Interactive Data Corporation (IDC), like its chief competitor Data
Resource Inc. (DRI), had its roots in computer information technology
at MIT. In 1968 the Computer Communication Center, a spin-off from
Lincoln Labs, merged with the Interactive Data Services Division of
White, Weld & Company. Jack Arnow, President of Computer Communica-
tions, became and remains President of IDC; and Joseph Gal, a
partner in White and Weld, became IDC board chairman.

● In the early 1970's Chase Manhattan's Small Business Investment
Company took both a debt and equity position in IDC, on the recommen-
dation of the Chase Corporate Banking Department. Corporate Banking
felt that they and their corporate clients' financial planning
activities could be enhanced using electronic technology.

● In 1972 Chase financed the acquisition of the automated data services
division of Standard and Poors, Interactive Data Services Inc. (IDSI),
which supplied automated security pricing data to financial institu-
tions, and municipal pricing data to federal and state agencies.
The acquisition was both defensive and offensive. It was defensive

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in the sense that the data which IDC was getting from IDSI was poor in quality in terms of electronic standards. It was offensive in the sense that IDC became even more of a data utility.

- In 1974 Chase Manhattan Bank acquired all the IDC outstanding stock and debentures based on the following rationale:

  - The bank was already in the business of giving economic and financial advice. It may as well sell it for a profit.
  - The bank was a large user of time-sharing computer services.
  - The banks' corporate clients and IDC's clients were the same.
  - The bank could obtain a rich source of advanced technology and technical expertise.
  - Otto Eckstein had already proven the concept of combining economic analysis, data, and electronic technology with DRI, a public company.

- In 1975, IDC and Chase Econometrics Associates (CEA) began a coordinated effort to market services for corporate planning. CEA data bases, forecasts and models were offered through IDC.

- IDC has made two small acquisitions in 1977. They purchased the XSIM Computer Programming Language as an asset, and hired the key employees involved from Dynamic Associates. IDC recently acquired Financial Transaction Services (FTS). FTS formed when the Boston office of First National City Bank of New York closed. FTS is involved in corporate funds transfer services, primarily in the international marketplace.

B. ORGANIZATIONAL STRUCTURE

1. CHASE MANHATTAN BANK

- IDC is one of three subsidiary corporations that reports to Leo S. Martinuzzi, Senior Vice President, Information Services. The day to day corporate interactions between IDC and Chase are handled by Mr. John McElroy, Vice President Information Services (see Exhibit III-1).

- Chase Econometrics Associates (CEA) was purchased directly by the bank to offer econometric and financial forecasting service to banks and corporate groups on a fee basis. The CEA financial and forecast data bases and the forecasting models were first offered through ADP Cyphernetics timesharing network. Following the acquisition of IDC in 1975, CEA data bases and forecasting models were also made available on the IDC network. The marketing agreement with ADP expires in 1978. It appears that Chase is encouraging CEA and IDC to make a stronger effort to coordinate joint marketing of their services. However no indication has been given toward merging the two subsidiaries.

- The third subsidiary in Chase or Information Services is the newly formed Chase World Information Corporation. The corporation special- izes in developing business, financial, commercial and environmental information about emerging countries to better plan with Chase corporate customers the development of East-West trade. The corpora- tion is using the services of both CEA and IDC in analysis, data base development and forecasting.

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EXHIBIT III-1

ORGANIZATIONAL STRUCTURE OF

CHASE MANHATTAN BANK INFORMATION SERVICES

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                    │                                 │
                    │       RETAIL BANKING AND        │
                    │      INFORMATION SERVICES        │
                    │                                 │
                    │       BARRY F. SULLIVAN          │
                    │     EXECUTIVE VICE PRESIDENT     │
                    │                                 │
                    └─────────────────────────────────┘

                              ┌──────────────────────────────┐
                              │   INFORMATION SERVICES        │
                              │   LEO S. MARTINELLI, JR.      │
                              │   SENIOR VICE PRESIDENT       │
                              └──────────────────────────────┘
                                      ┌──────────────────────┐
                                      │   JOHN MCELROY        │
                                      │   VICE PRESIDENT      │
                                      └──────────────────────┘

  ┌──────────────────┐   ┌──────────────────────┐   ┌──────────────────┐
  │   INTERACTIVE    │   │  CHASE ECONOMETRIC   │   │   CHASE WORLD    │
  │ DATA CORPORATION │   │   ASSOCIATES INC.    │   │  INFORMATION     │
  │ JACK ARNOW, PRES.│   │ MICHAEL EVANS, PRES. │   │  CORPORATION     │
  └──────────────────┘   └──────────────────────┘   └──────────────────┘
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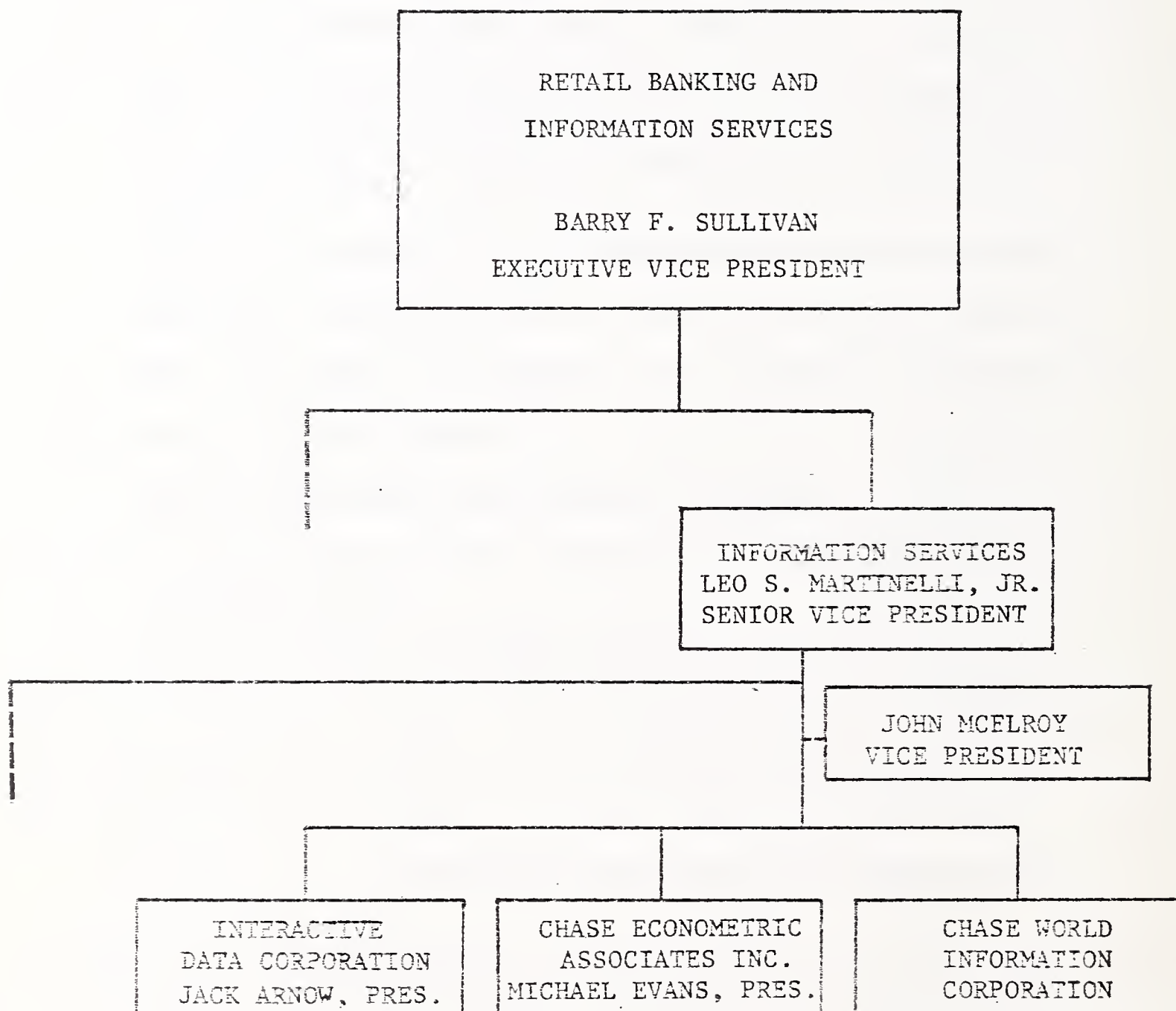
2. Interactive Data Corporation

● The IDC organizational structure is shown in Exhibit III-2.
The major portion of the 450 personnel are at the corporate head-
quarters in Waltham and at a new computation center close by.

● The IDC executive staff has remained stable, having come from either
Corporate Communications or White and Weld. Key executives are:

- Jack A. Arnow, President. Founder and president of Computer
   Communications Center. Prior to that he was a Group Leader
   M.I.T. Lincoln Laboratory Computer Systems Group. He was
   instrumental in the development of the CP/CMS Time-Sharing
   System for the IBM 360/67, and was responsible for its implemen-
   tation as a reliable time-sharing service for Lincoln Laboratory
   users. He also directed the operation of the Laboratory's
   Computer Center. From 1950 through 1957, he was responsible for
   the design, development, and implementation of the first produc-
   tion SAGE program, which was the first large-scale programming
   project ever undertaken.

- Frank Belvin, Vice President, Planning. Formerly Communications
   and Computer Systems Groups M.I.T. Lincoln Laboratory 1961-1968,
   where he was responsible for the design, and implementation of
   multi-programming and time-sharing systems for general Lincoln
   Laboratory usage.

- John Rutherford, Vice President Development. A.B. Princeton
   1962, LLB Harvard Law School 1966. Formerly Associate, Sherman
   & Sterling, attorneys in New York City.

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EXHIBIT III-2

IDC ORGANIZATIONAL STRUCTURE

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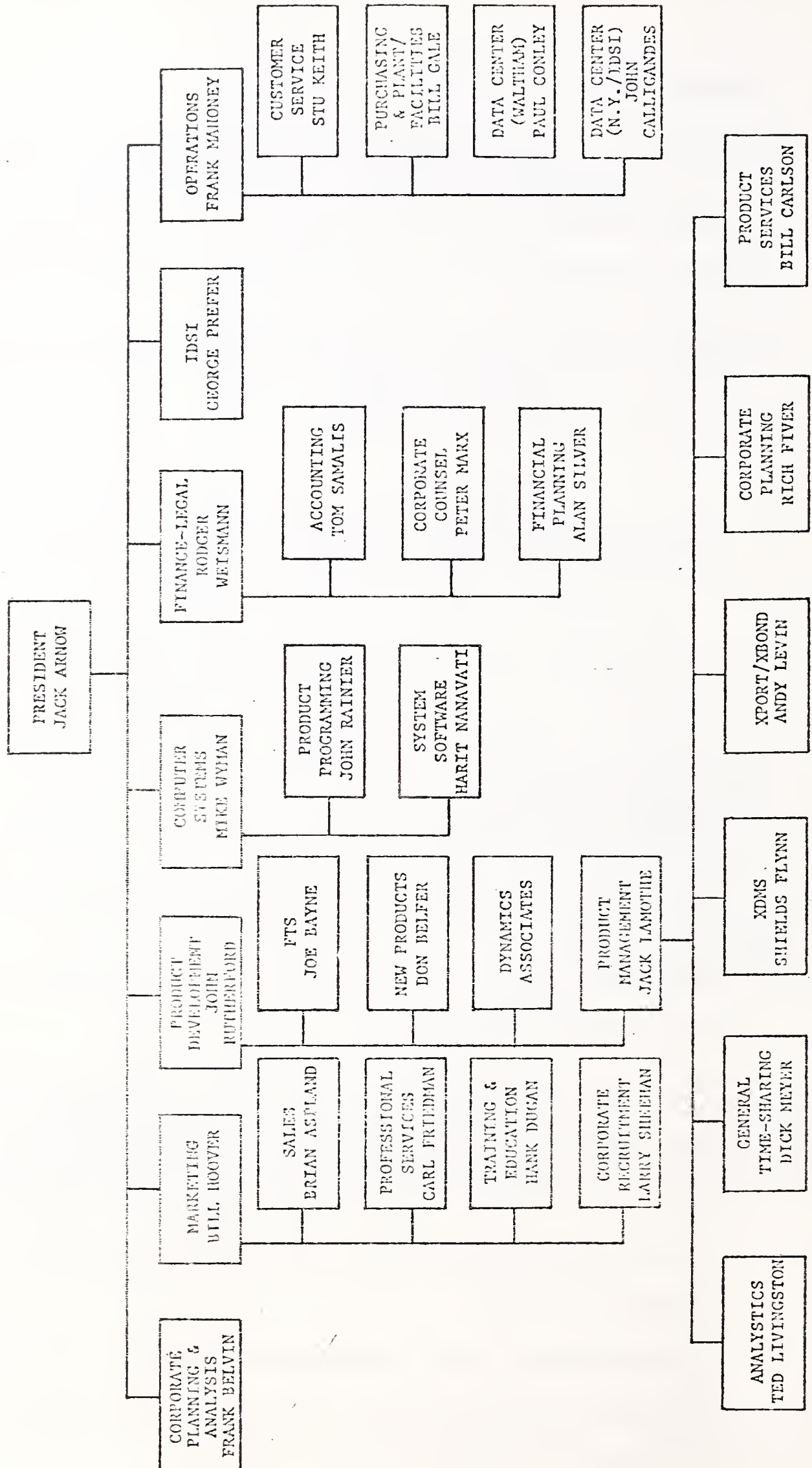
3. MARKETING ORGANIZATION

•   IDC has greatly expanded its national coverage in the past two (2)
    years. This is consistent with its increased emphasis on corporate
    financial and planning services. The five (5) regional offices and
    eleven (11) branch offices currently cover all but the Southeast
    and mountain regions of the U.S., and extend to England. IDC will
    complete coverage of the U.S. and extend branch offices in Europe
    during 1978. (see Exhibit III-3) IDC plans to open 4-5 new offices
    this year.

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EXHIBIT III-3

IDC MARKETING ORGANIZATION

REGIONAL OFFICES	BRANCH OFFICES
San Francisco, CA	Los Angeles, CA
Chicago, IL	Hartford, CN
Boston, MA	Stamford, CN
New York, NY	Washington D.C.
London, England	Detroit, MI
	Minneapolis, MN
	East Orange, NJ
	Cleveland, OH
	Philadelphia, PA
	Pittsburg, PA
	Milwaukee, WI

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C. REVENUES

- IDC has been experiencing an average annual growth rate of 35% or 6% above the industry average of 29%. Annual revenues for the last three years are:

1975	1976	1977 (est)
$12M	$16M	$22M

- Chase Manhattan supplies 20% or $4.5 million of 1977 revenues.

- Interactive Data Services, Inc. contributes just over 10% or $2.5 million of 1977 revenues.

- IDC contributes 17% of gross revenue or over $4 million to Chase profits.

- Over $13 million, or 60% of IDC revenues, come from services rendered to banks, brokerage houses and other financial institutions. Only about 2% of revenues are federal government related (see Exhibit III-4).

- Over $12M or 57% of IDC 1977 revenues came from Remote Computing Services. Another $6.5 million, or 30%, came data base related services, including $2.5M from IDSI (see Exhibit III-5).

- Well over half 65% or $13.4 million, of IDC's revenues still come from the Northeast area. This includes $4.5 from Chase and about $1.5 of $2.5 million from IDSI. In the past year IDC has expanded

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EXHIBIT III-4

IDC REVENUES DISTRIBUTED BY INDUSTRY MARKETS

INDUSTRY MARKETS	1977 DISTRIBUTION	
	$	%
BANKING & FINANCE	13.2	60
FEDERAL GOVERNMENT	.4	2
STATE & MUNICIPALITIES	.7	3
INSURANCE	1.1	5
MANUFACTURING	4.0	18
TRANSPORTATION	.4	2
UTILITIES	1.1	5
INTERNATIONAL	1.1	5
TOTAL	$22 M	100%

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EXHIBIT III-5

IDC REVENUES DISTRIBUTED BY SERVICES

SERVICES	1977 DISTRIBUTION	
	$	%
REMOTE COMPUTING	12.5M	57
BATCH SERVICES	1.0	4
PROFESSIONAL SERVICES	2.0	9
DATA BASES	6.5	30
TOTAL	$22 M	100%

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its national coverage but has not yet focused attention to the South-
East and Mountain regions (see Exhibit III-6).

D.   PERSONNEL DISTRIBUTION

•   There are approximately 450 people in IDC and its subsidiary IDSI.
    Company personnel are heavily technically oriented. Chase has
    purposely kept IDC as a separate organization apart from the bank
    to maintain the autonomy and technical excellence of the IDC staff.

•   The type and distribution of IDC staff is:

TYPE	NUMBER
– IDC Executives	8
– Marketing Representatives understand clients' needs and sell products and services	100
– Technical Consultants, located in regional and branch offices, train clients, assist in developing applications and support installed systems.	50
– Dynamics Associates Consultants, provide clients with consulting and software systems for corporate planning and analysis of securities markets	7

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EXHIBIT III-6

GEOGRAPHIC DISTRIBUTION OF 1977 IDC REVENUES
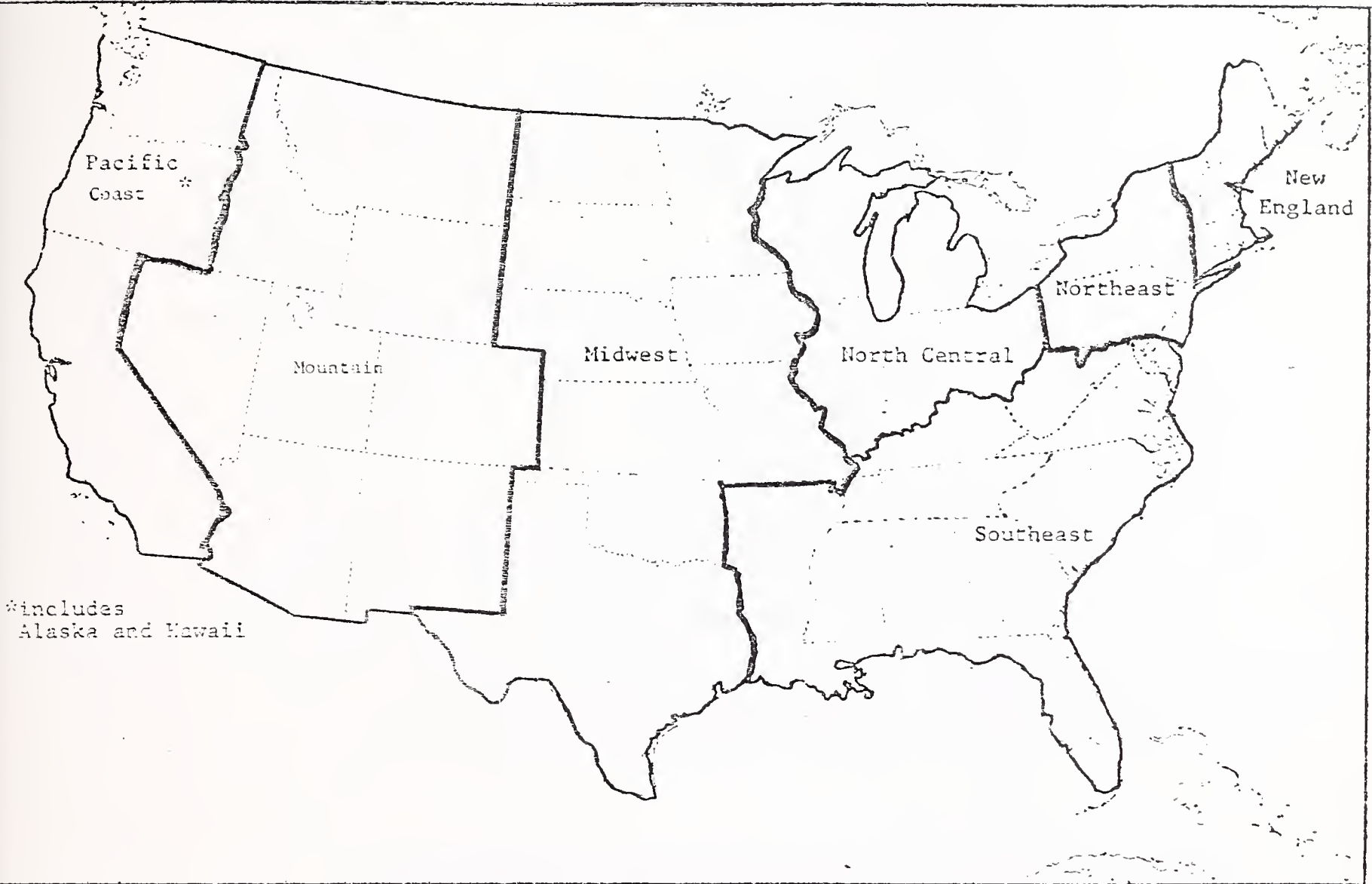
	1977 DISTRIBUTION	
	$(M)	%
NEW ENGLAND	2.2	10
NORTHEAST	13.4	60
SOUTHEAST	.4	2
NORTHCENTRAL	2.2	10
MIDWEST	.6	3
MOUNTAIN	–	–
PACIFIC COAST	2.2	10
INTERNATIONAL	1.0	5
TOTAL	$22 M	100%

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- Customer Service Representatives, located in home office to respond to customer inquiries.   7

- Product Management Staff, coordinate the development and support of present and proposed products.   35

- Computer Operators and Communications Specialists, operate IDC's computer center and communication network.   40

- Data Consultants and Data Collection Specialists, at home office, maintain quality control on all data bases   40

- Computer Systems Staff, improves current software products and designs and develops new systems.   30

- Professional Services Staff, in home office, designs and implements customer systems for clients   30

- IDSI Staff, collect daily pricing on securities and provide automated security pricing data   100
                                                                         ——
- TOTAL   450

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E. KEY PRODUCTS AND SERVICES

•   IDC provides the four components of a data utility: (1) financial
    and economic data bases; (2) software products; (3) a remote
    computing network; and (4) professional services. IDC's key
    products and services are oriented either directly at the financial
    marketplace, or the corporate financial side of industrial corpora-
    tions. Key products and services are:

    -   ANALYSTICS is a computer information service providing compre-
        hensive data retrieval, analysis and report generation for
        financial executives. The service consists of two major
        components: the data bases and the software systems which
        access the data, execute the analyses and prepare executive
        reports. The Analystics Service consists of the following
        products:

        .   The Analystics data bases which contain over 4 million financial,
            economic, and security market time series:
            -   Stock, bond, option and warrant data for over 35,000
                corporate issues and 1,500,000 municipal bonds.
            -   Financial statement data covering 3750 publicly traded
                corporations and 14,000 FDIC banks.
            -   U.S. economic data on weekly, monthly, quarterly and annual
                bases since 1948.
            -   International data including exchange rates for 100 currencies
                100 sets of national statistics, and 25,000 series for
                international transactions.

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- Forecast and estimate data including weekly earnings
  estimates on 1500 companies

. The XSIM financial, analysis and modeling programming language
for such applications as:

- Financial analysis

- Economic modeling

- Corporate planning

- Budget and control

- Industry analysis

- Product line forecasting

- Statistical analysis

. The XDMS data management system used for data base creation,
maintenance, interrogation and reporting. Applications
include:

- Loan and mortgage portfolio systems

- Security and option position tracking

- Customer information systems

- Market analysis and planning

- Sales inventory and capital equipment control systems.

. XPORT is a portfolio management information and performance
measurement system for money managers and corporate financial
executives. Applications include:

- Performance measurement such as dollar and time-weighted
  rates of return.

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- Pricing including all securities traded on the major exchanges, adjusted for splits and dividends.
- Portfolio accounting, including integrated cash and security accounting, tax and cost accounting, and broker commission analysis.

. XSCAN is a securities analysis system designed to aid investment analysts, financial researchers and corporate planners by rapid series scanning of corporate data on 5,500 companies and 42,000 securities. Applications are:

- Industry performance

- Corporate financial listing evaluation

- Merger and acquisition searches

- Intra-industry corporate financial comparisons

. The Graphics programming system which produces a wide variety of camera ready graphics including scatter diagrams, regression lines and histograms.

. The COBOL, FORTRAN, PL/1 and basic programing languages together with the IDC symbolic debugging systems, with interface capability to XSIM, XPORT, XSCAN and XDMS.

- EXSTAT Database - covering 160 annual balance sheet and income statement items on over 2000 U.K. and foreign companies since 1971, including:

. 1200 British listed companies

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- 125 British unquoted

- 425 Continental European countries

- 250 Australian companies

- The Housing/Mortgage Long Run Model, historical data bases and forecasts of households, housing and mortgage data. Typical applications are:

  - Housing formation
  - Housing market activity
  - Mortgage market activity

- The National Gas Model forecasts availability of natural gas and oil within the U.S. The model uses 1250 equations in its formulation. Typical applications are:

  - Production and distribution of natural gas, petroleum, electricity and coal.
  - Petrochemical manufacturing.
  - Steel and aluminum production

- The National Association of Homebuilders regional housing and mortgage model services consist of historical data bases, a short term model and forecasts. Typical applications are:

  - Housing starts and completions by state, region, and national
  - Mortgage and savings floors, regional etc.

- The Chase Econmetrics Associates, Inc. econometric consulting services including:

  . Historical data bases

  . Forecast data bases

  . Forecast by models

  . Report Services

- The Merrill Lynch Economics, Inc. econometric consulting services including:

  . Merrill Lynch Economics data bases

  . Economic forecats

  . Econometric forecasting models

  . Report services

- Corporate Planning Services combines the products and services outlined above with IDC professional services staff to consult with and train corporate planners in developing effective application packages. Corporate Planning Services are offered four areas:

  . Financial; typical applications are:

  - Cash management

  - Long term financing

  . Economic; typical applications are:

  - Product line forecasting

  - Input/output production analysis

- Corporate

  - Capital budgeting

  - Long term planning

- Marketing

  - Pricing

  - Market analysis

- Financial transfer services include a system that converts international funds transfer instructions from the format developed by the Society for Worldwide Interbank Financial Transactions into format for direct entry into the Clearing House Interbank Payment System of the New York Clearing House Association. The system incorporates the three facets of the Chase Info Cash International series.

  - Chase Account Reporter via Terminal (CHART)

  - Regional Balance Reporter

  - Chase Automated Payments Processing Service (CAPPS)

- Detailed IDC literature on each of the above services is provided in Appendix A.

- Customers use IDC products and services in a variety of ways. The following examples are illustrative of product/services use.

- The Economic Services Department of Union Carbide uses XSIM, the Analystics data bases, and the IDC time-sharing network to establish and maintain a forecast data base of industrial information extending

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out two (2) years. The single input base enables all divisions of

Union Carbide to forecast on a consistent base. Using XSIM, Union

Carbide has also developed its own product models. The combination

of a readily useable modeling language and uniform data base

accessibility has made the education rate much easier, and has

fostered increased use of financial and product forecasting.

- The $895 million deposit City Federal Savings and Loan Association

  of Elizabeth utilized the consulting services of Professors Kenneth

  Rosen and Dwight Jaffee to develop a model of New Jersey's mortgage,

  housing, and interest rate structure. The National Association of

  Home Builders Regional Housing model was used on IDC's time-sharing

  network. A 60 equation model developed in XSIM was used to

  extrapolate the housing starts, net savings floors and interest rate

  structure for New Jersey.

- The Bank of New York developed a computerized information system

  for mutual funds using IDC's XDMS data management, XPORT portfolio

  analysis systems, and the Analystics data bases. The system performs

  daily fund pricing, portfolio reports, and all general ledger

  functions. Access to fund data can be accomplished via terminals in

  the company's offices via the IDC time-sharing network.

- The John Hancock Mutual Life Insurance Company created specialized

  computer programs using XSIM and XDMS to improve management of group

  pension funds. The software accesses the IDC securities, Value Line.

  Compustat, Chase Econometrics and FDCI data bases. A highlight of

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the system is a "best trades" determination where broker commissions are aggregated over time to determine if the best prices were obtained.

- The Ranier National Bank in Seattle uses the Portfolio Optimization Program (POP) and the Risk of Loss Analysis Program, developed by Gifford Ford Associates and available on the IDC timesharing network to measure the impact of securities transactions on portfolio diversification and risk, and to access minimum risk allocations in investments according to level of expected return. Gifford Ford Associates, a division of Oppenheimer & Co. uses the SDC time-sharing network and the Analystics data bases to provide their clients access to all their systems on an interactive computing basis.

- General information concerning users and typical applications for IDC products/services is contained in Chapter V section B, Financial and Economic Remote Computing Services (FERC).

F.   TIMESHARING NETWORK

- IDC has its own communication network with nodes in major cities throughout the U.S. The network is interconnected to Europe via communications satellite. The network supports a wide variety of 15 cps, 30 cps and 120 cps terminals through COMTEN communications processors. IDC also uses the TYMNET network until the workload justifies installation of its own lines.

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- IDC has 2 IBM 370/168 processors at its new computation center at Waltham. The processors are front ended with COMTEN communication processors. IDC uses its own operating system which is an enhanced version of CMS. IDC also has an IBM 370/145 at IDSI in NYC for producing automated securities pricing data. The IBM 370/145 is interconnected to the processors in Waltham so that closing security prices are available each day to IDC subscribers.

- IDC is in the process of expanding the network in Europe in order to offer international corporate funds transfer services.

- Users report that they find the network easy to access, and reliable; they experience rapid response to terminal requests, but find the network expensive to use for general timesharing.

G. CUSTOMER BASE

- IDC targets its services to:

    - Banks and financial intermediaries with assets over $100 million.

    - Thrift institutions with deposits over $250 million.

    - Fortune 500 Corporations.

    - National and regional brokerage homes.

    - Selected governmental organizations.

- IDC's client base is estimated between 450-650. Many of the larger organizations are multiple users of IDC services. Some organizations have in excess of 200 user identification codes for authorized use assigned. Each division, subsidiary, etc., when billed individually is considered a report user.

- Banking and finance users still constitute the major customer base (54%). However, corporate planning users are becoming a significant customer base (22%). The greatest customer growth area is expected to be in the international marketplace (see Exhibit III-7).

- Although IDC's initial clients were in New England (17%) and the Northeast (28%), IDC has in the past 18 months made considerable penetration in the North Central (17%) and Pacific Coast (15%) regions. IDC has not yet made entry into the Mountain Region. IDC appears to be focusing its expansion attention to the international marketplace (see exhibit III-8).

H.   PRODUCT PRICING

- Comparative product pricing is at best a most difficult task. The pricing policies of time-sharing vendors vary greatly from published price schedules which themselves are frequently changed. Exhibit III-9 presents comparative pricing for four (4) RCS vendors using large IBM 370 or equivalent systems. IBM computer based time-sharing costs te to be higher than those of other vendors, such as CDC or DEC. IDC is generally known as being non-competitive when selling general time-sharing services.

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EXHIBIT - III-7

IDC CUSTOMERS DISTRIBUTED BY INDUSTRY MARKETS

INDUSTRY MARKETS	1977 DISTRIBUTION	
	#	%
BANKING & FINANCE	270	54%
FEDERAL GOVERNMENT	20	4
STATE & MUNICIPALITIES	15	3
INSURANCE	25	5
MANUFACTURING	110	22
TRANSPORTATION	15	3
UTILITIES	25	5
INTERNATIONAL	20	4
TOTALS	500	100%

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EXHIBIT - III-8

GEOGRAPHIC DISTRIBUTION OF 1977 IDC CUSTOMERS
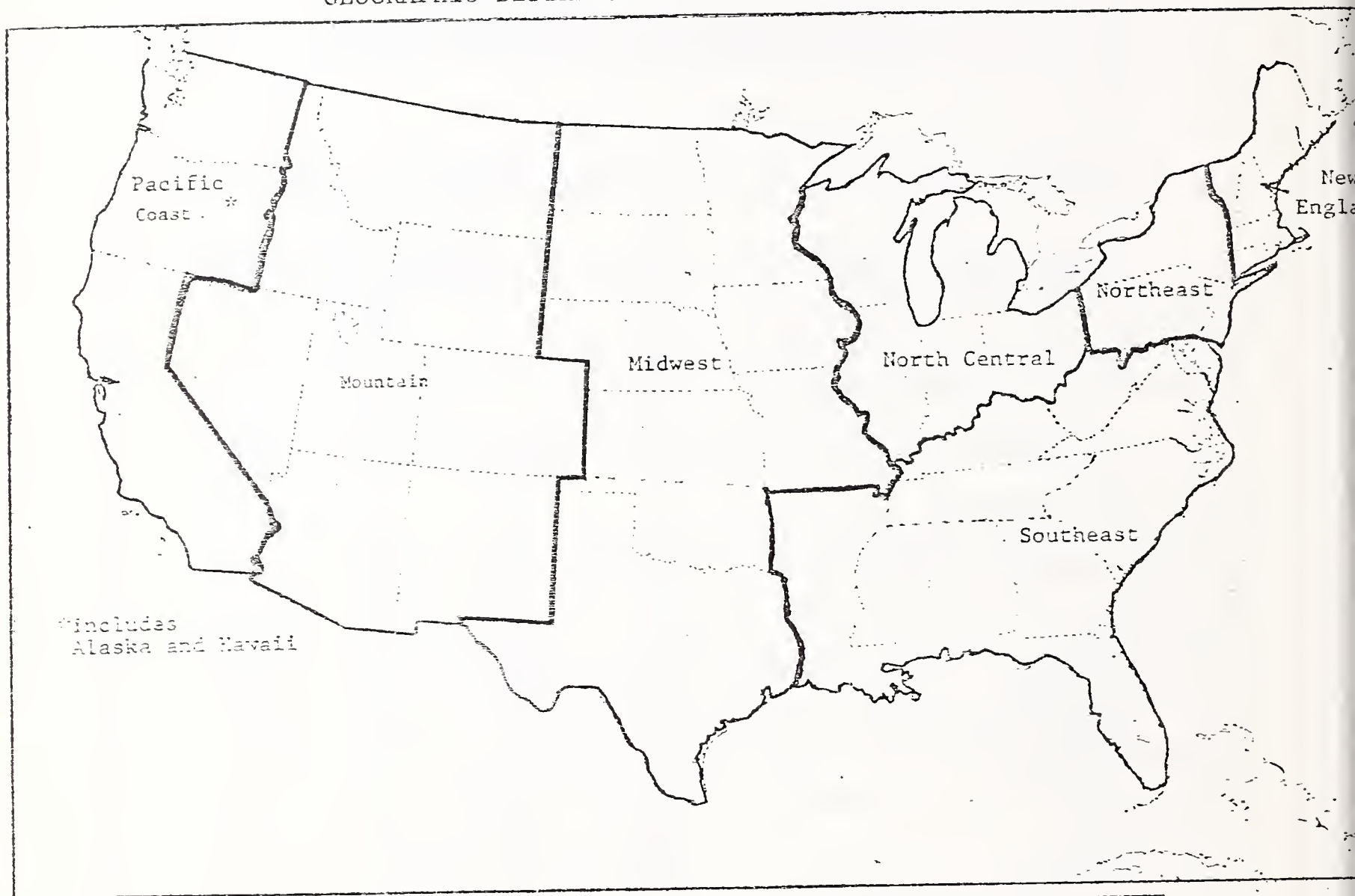
	DISTRIBUTION 1977	
	#	%
NEW ENGLAND	85	17
NORTHEAST	140	28
SOUTHEAST	45	9
NORTH CENTRAL	85	17
MIDWEST	50	10
MOUNTAIN	−	−
PACIFIC COAST	75	15
INTERNATIONAL	20	4
TOTALS	500	100%

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EXHIBIT III-9

COMPARATIVE PRICING FOR REMOTE COMPUTING SERVICES

IBM 370 158/168 SYSTEMS

INTERACTIVE MODE

VENDOR	UDC	TYMSHARE		RAPIDATA		NAT. CSS
SYSTEM	370/168	370/158		370/158		AMDAHL
TYPE OF USAGE	ALL	PRIME	OTHER	PRIME	OTHER	ALL
CONNECT CHARGES						
15 CPS PORT	10.00	12.00	6.00	11.00	5.00	10.00
30 CPS PORT	13.00	12.00	6.00	13.00	7.00	13.00
120 CPS PORT	20.00	18.00	9.00	17.00	17.00	20.00
CPU/TRU/APU PER UNIT	.16	.25	.15	.20	.20	.20
INPUT/OUTPUT PER OPERATION				.00125	.00125	
DISC (212 800 BYTES/CYL) ONLINE STORAGE						
5 CYLINDERS/MONTH/CYLINDER	35.00	30.00	30.00	30.00	30.00	22.00
25 CYLINDERS/MONTH/CYLINDER	28.00	25.00	25.00	22.00	22.00	20.00
TEMPORARY ONLINE STORAGE/HR.						
100 CYLINDERS	35.00	100.00	100.00	100.00	100.00	100.00
20 CYLINDERS	10.00	20.00	20.00	20.00	20.00	20.00
5 CYLINDERS	2.50	5.00	5.00	5.00	5.00	5.00

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- The real crux of the comparative pricing analysis is the "compute's worth" of IDC's CPU vs. Tymshare's Resource Unit (TRU) vs Rapidata's CPU vs National CSS's Application Resource Unit (ARU). Running benchmarks to obtain true comparative pricing was outside the scope of this study.

- For interactive processing the CPU (or equivalent) charges turn out to be some multiple of the connect charges. Typical IDC terminal to CPU costs are quoted as:

<div align="center">

Per Hour

	Terminal	CPU	Factor
FORTRAN IV	$13.00	$40.00	3
XSIM	$21.45	$165.00	9

</div>

- Finally, IDC like other RCS vendors negotiates dollar volume discounts for large users. For example, Chase with over $600,000/month in billed costs receives a 40% discount. IDC offers customers with billings over $10,000/month, a 10% discount.

- IDC's basic pricing methods differ from that of most of its competitors. IDC charges a standard set of charges for its time-sharing services and adds a surcharge for use of its software systems such as XSIM. For example, the basic interactive timesharing charges are:

<div align="center">

Connect charges per hour (30 cps) $13.00

CPU charges per unit   .16

</div>

The CPU charges reflect utilization of all resources of the computer and the method of measuring the charges is not often changed. To use XSIM there is a surcharge of:

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<div align="center">

Connect time   65%

CPU time   65%

</div>

Other time-sharing vendors hide the cost of software products in the CPU or equivalent unit. Details of IDC Data Processing Services price can be found in Appendix B.

- IDC charges for its XPORT services based on XPORT units at .01 per unit. This is also a surcharge method over CPU units. It is used because the XPORT programming languages is composed of MACRO commands which do repetitive processing of a base number of items in a portfolio or in a time series. Details of XPORT pricing are found in Appendix B.

- There is a wide variation in the method of charging for subscription to the Analystics Data Bases. The data base subscription prices are set by the data base vendor (i.e., Investors Management Sciences,, Arnold Bernhard & CO., etc.), and are either passed through IDC or collected directly. Those data bases which are proprietary to IDC (i.e., IDSI and EXTEL) are supplied at either no charge or on a cost per item accessed. Examples are:

  - IDSI

    - FASTPRICE - 0 - 05 per price

    - Split Dividend - n/c

    - Security Master Data Base - n/c

    - MASTERPRICE 0.05 per price or yield

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- Compustat

  . 1st file $4500/year

- Value Line

  . $5000/year or

  . $2000 for 4 months or

  . 0.07/item

- EXTAT

  . 0.08 per item or

  . 700/month or

  . 6500/yr

- IDC uses the surcharge method of accessing most but not all of the Analystics Data Base. For interactive access the charges are:

  - First 25,000 access units $ .02 per unit

  - Next 25,000 access units   .01 per unit

  - Next 50,000 access units   .005 per unit

  - All additional   n/c

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IV. MARKET ANALYSIS

IV. MARKET ANALYSIS

A. MARKET STRUCTURE

- The market for data base related economic and financial computing services can be subdivided into four "types" of services:

    - Econometric Consulting Services (ECS)

    - Financial & Economic Remote Computing Services (FERC)

    - Data Base Subscription Services (DBS)

    - Financial Inquiry Services (FIS)

- The four services are interrelated and in some companies overlapping. Several vendors offer more than one service. Thus, in many cases it was not always possible to distinguish one type from another in assigning and forecasting market values or company revenues. In any single case, however, INPUT believes the overlay is no more than 20%. Expenditures, revenues, and forecasts shown in this analysis have been adjusted to account for this overlap.

- The relationship between the four services are depicted in Exhibit IV-1.

B.   MARKET SIZE

- The market for financial and economic data base related services represents a major business opportunity for computer services companies. In total, the market will grow from $153M in 1976 to $373M by 1981; this is a 20% average annual growth rate. The market is shown broken down by type of service in Exhibit IV-2.

- All services except FIS are growing at over 20% per year. In 1976, ECS, FERC, and DBS account for 48% of the overall market. This share will grow to 69% by 1981. (See Exhibit IV-3.)

- The largest market share goes to FERC which, by itself, will account for nearly half of all user expenditures by 1981 ($180M). At the same time, DBS revenues will be $22 million which is only 11% of the combined FERC and DBS revenues. This means that the "value added" by providing access to data bases over networks will account for 89% of each dollar of revenue.

  - The obvious conclusion is that one <u>must offer remote computing</u> to build a significant business volume in this market.

- Users of financial and economic data bases (except FIS) tend to be concentrated among the largest industrials (Fortune 500), 100 large banks and insurance companies, and the top 20 thrift institutions, and some government agencies.

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EXHIBIT IV-1

FINANCIAL, AND ECONOMIC DATA BASE SERVICE RELATIONSHIPS

END USER

FINANCIAL AND ECONOMIC REMOTE COMPUTING SERVICES (FERC)
- Access Tools
- Models
- Report Generators
- Offered by BCS, CEIS, ADP, etc.

ECONOMETRIC CONSULTING SERVICES (ECS)
- Analysis/Interpretation
- Consulting Services
- Offered by Chase, DRI, etc.

FINANCIAL INQUIRY SERVICES (FIS)
- Remote Data Access
- Offered by GTEIS, Quotron, Bunker-Ramo

RCS, NETWORKS

CONSULTANTS

STOCK EXCHANGE DATA

SPECIAL-IZED NETWORKS, SOFTWARE

DATA BASE SERVICES (DBS)
- Time Series Data
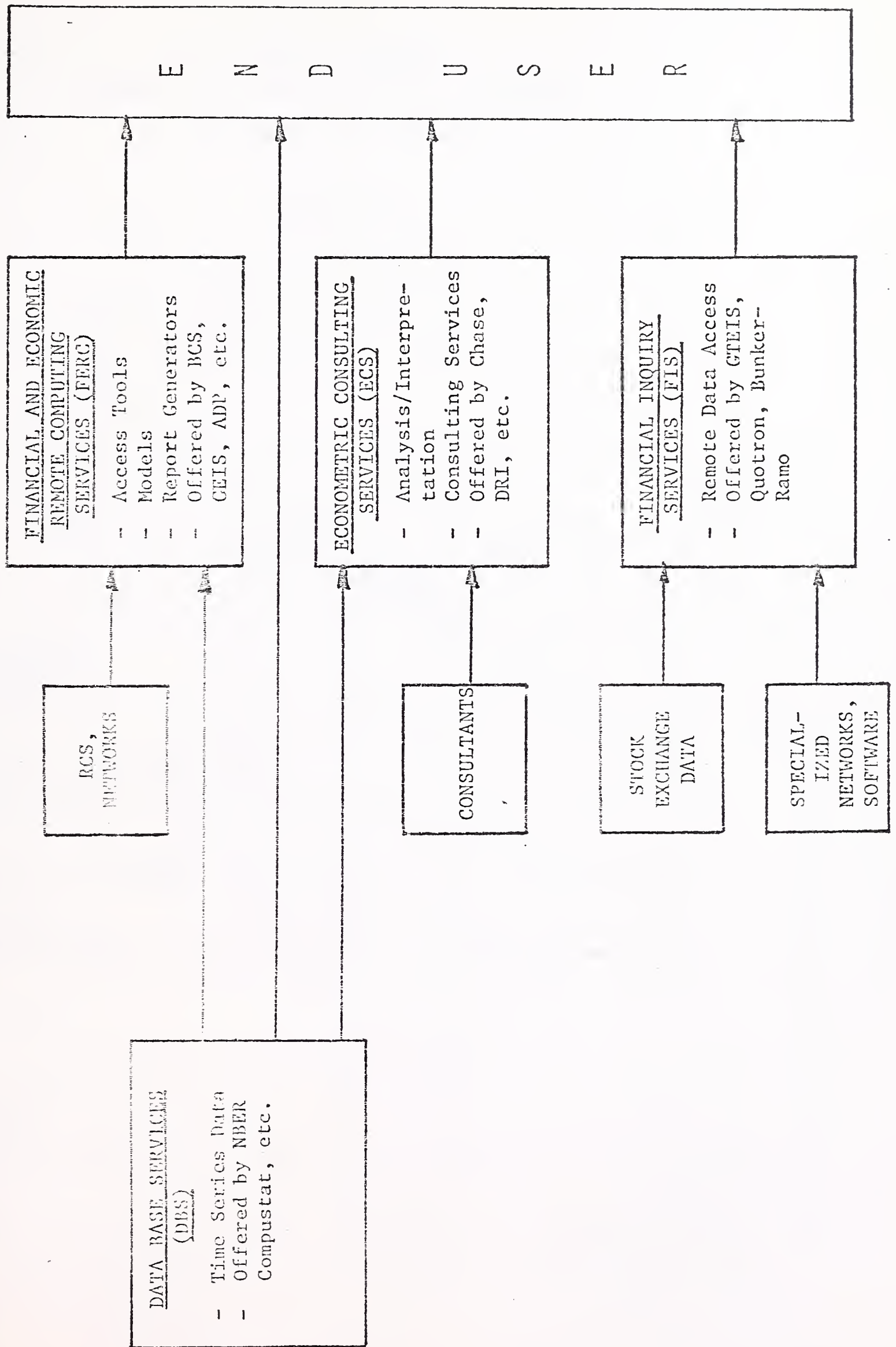- Offered by NBER Compustat, etc.

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EXHIBIT IV-2

FORECAST OF MARKET FOR
FINANCIAL AND ECONOMIC DATA BASE RELATED
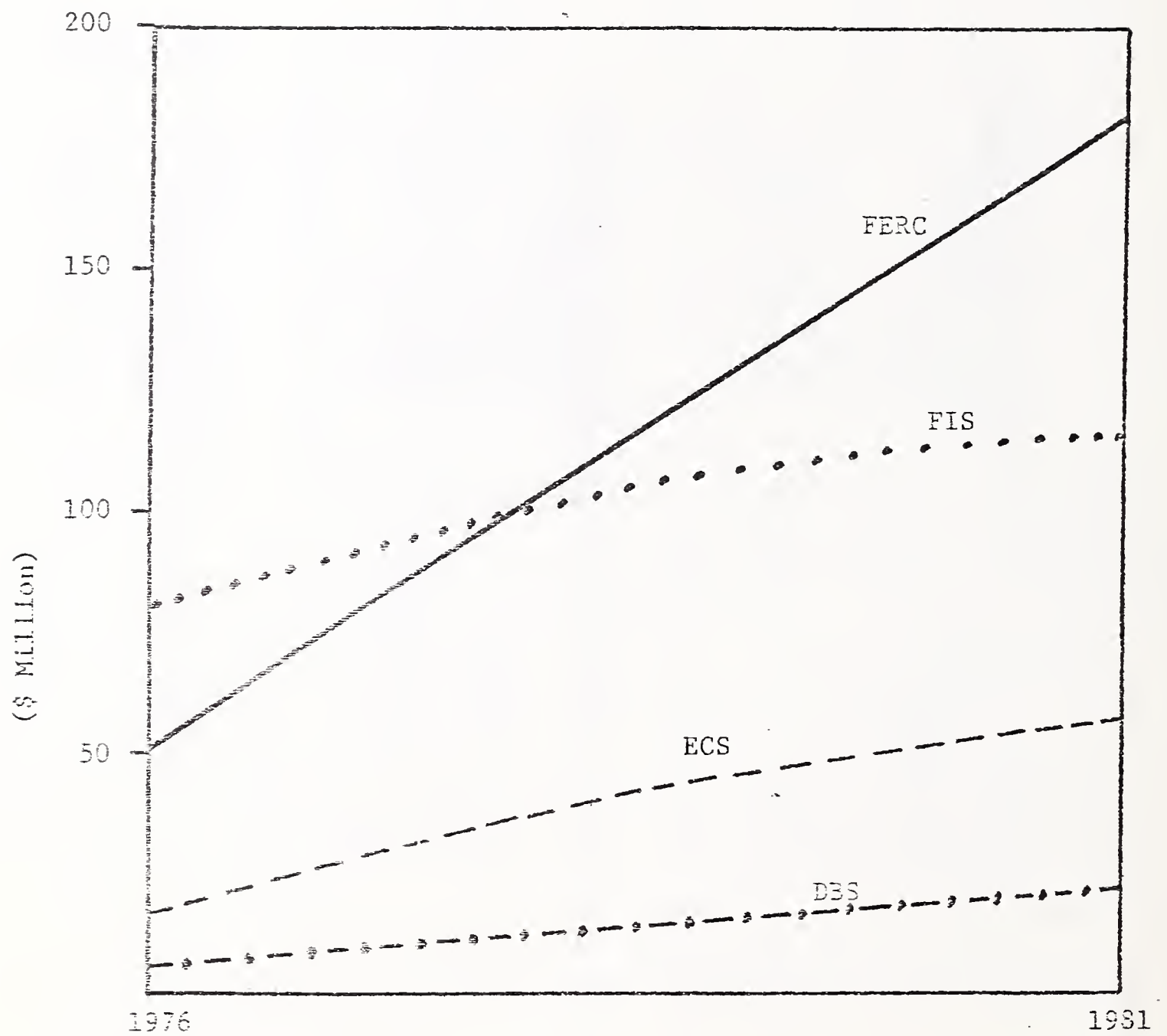REMOTE COMPUTING SERVICES

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EXHIBIT IV-3

FORECAST OF MARKET FOR

FINANCIAL AND ECONOMIC DATA BASE RELATED

REMOTE COMPUTING SERVICES

TYPE	EXPENDITURES				AVERAGE ANNUAL GROWTH RATE (%)
	1976		1981		
	AMOUNT ($M)	% OF TOTAL	AMOUNT ($M)	% OF TOTAL	
ECONOMETRIC CONSULTING SERVICES (ECS)	16	10%	56	15%	28
FINANCIAL & ECONOMIC REMOTE COMPUTING SERVICES (FERC)	51	33	180	48	29
DATA BASE SUBSCRIPTION SERVICES (DBS)	6	4	22	6	30
SUB TOTAL	73	48	258	69	29
FINANCIAL INQUIRY SERVICES (FIS)	80	52	115	31	7.5
TOTAL	153	100%	373	100%	20

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● There is, however, a substantial demand for these services by
   smaller concerns. At current prices these smaller concerns cannot
   afford to buy data base services via remote access, and are con-
   strained to "paper" services. If remote computing costs diminish,
   or if vendors offer access to subsector-aggregated data bases where
   user fees are less than they are at present, the market could be
   substantially expanded beyond that forecasted.

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V. COMPETITIVE ENVIRONMENT

V.   COMPETITIVE ENVIRONMENT

A.   ECONOMETRIC CONSULTING SERVICES (ECS)

- The ECS marketplace is currently dominated by three companies, Data
  Resources, Inc., Chase Econometrics, and Merrill Lynch Economics,
  which together account for 90% of the market (see Exhibit V-1).

  - Data Resources has 45% of the market.

  - Chase Econometrics has 25% of the market.

  - Merrill Lynch has 20% of the market.

- Chase Econometrics Association (CEA) is the only bank-related
  organization in this market segment.

- Data Resources Incorporated:

  - Offers integrated econometric consulting services, interactive
    remote computing services, and comprehensive data bases.

  - 1976 revenues $15.6 million, 50% of which are from its inter-
    active RCS operations, growing at a rate of 25% per year with
    over 400 clients almost all of whom are on-line.

  - Services primarily Fortune 300 companies larger banks, and
    financial intermediaries.

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EXHIBIT V-1

ECONOMETRIC CONSULTING SERVICES (ECS)

1976 VENDOR MARKET SHARES

NAME	NUMBER OF CLIENTS	ESTIMATED 1976 REVENUES ($M)		1976 ANNUAL GROWTH (%)
		TOTAL	RCS PORTION	
Chase Econometrics	700	8.5	4.6	20
Data Resources, Inc.	400	15.6	8.2	25
Merrill Lynch Economics	280	6.5	2.6	25
Wharton Economic Associates, Inc.	200	2.5	.4	33
All Others	100	1.0	.2	25
Total	1680	34.0	16.0	25

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- Chase Econometrics, Incorporated:

  - Until recently not fully integrated. Offers economic and econometric consulting services directly, and forecasting models and data bases through two timesharing services, Interactive Data Corporation (IDC, a Chase subsidiary) and ADP Network Services (Cyphernetics).

  - Has a larger number of subscription customers than RCS users.

  - 1976 revenues $8.5 million; 80% of which comes from on-line clients, growing at a rate of 20% per year with over 700 clients.

  - Services large banks, Fortune 300 companies, and financial intermediaries.

- Merrill Lynch Economics:

  - A reorganization of Lionel Edie Economics, an old line financial advisory services. Offers financial, economic and econometric consulting services directly, and econometric forecasting and data bases through Interactive Data Corporation (IDC) and National CSS.

  - 1976 revenues $6.5 million, 50% derived from subscription consulting, growing at the rate of 25% per year, has over 280 clients.

  - Services Fortune 500 companies, as well as large and medium size banks and financial intermediaries.

- Profiles of the three leading vendors can be found in Appendix C

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B. FINANCIAL AND ECONOMIC REMOTE COMPUTING SERVICES (FERC)

- The FERC marketplace is widely divided. There are more than ten (10) companies offering specific services. No single vendor has more than 30% of the current marketplace (see Exhibit V-2).

- Interactive Data Corporation (IDC) is the only bank related organization operating in this marketplace. IDC considers its main competitors to be DRI and ADP. IDC's and CEA's revenues in combination are currently larger than DRI's.

- Profiles of the ten (10) leading vendors can be found in Appendix D.

- Current users and typical applications are outlined below and summarized in Exhibit V-3.

- Commercial Banks:

    - There are a large number of users in commercial banks.
    - The director of corporate planning uses FERC services for profit planning and reporting.
    - The economic research departments use FERC to supplement econometric consulting services.
    - The director of management sciences is a significant user of these services for special long range corporate studies.
    - The manager of securities analysis in the trust department uses economic remote computing services for portfolio analysis.

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EXHIBIT V-2

FINANCIAL AND ECONOMIC REMOTE COMPUTING SERVICES (FERC)

REVENUES BY COMPANY (TOP 10 ONLY)

NAME	TOTAL U.S. RCS REVENUES 1976 ($M)	FERC PORTION	
		($M)	(%)
ADP Network Services	21	3	14
Boeing Computer Serv. (Outside RCS)	40	3	8
Compu-Serv	10	1.5	15
Data Resources Incorporated	16	2	12
General Electric Information Services	125	15	12
Interactive Data Corp.	16	5	31
National CSS	40	4	10
Rapidata	18	6	33
Remote Computing Corp.	9	3.5	39
Service Bureau Company	50	5	10
Total (Top 10)	345	48	14

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- Thrift Institutions:

  - Large thrift institutions are becoming more frequent users of FERC.

  - Very few thrift institutions have professional economists with doctoral degrees, however MS/MBAs who have had university FERC experience are becoming responsible for forecasting activities.

  - The financial vice president uses the service for merger and acquisition studies.

  - The director of corporate planning uses these services for profit planning and profit evaluation.

  - The manager of market research uses the services for national and regional studies of the private housing market.

- Institutional Investors

  - These organizations include insurance companies, mutual and capital fund managers, bank management investment corporations and national and regional brokerage houses.

  - There are a large number of users in these organizations.

  - The money managers of these organizations are frequent users of FERC. In large organizations it supplements ECS.

  - The financial vice president for investment in insurance companies uses FERC for investment planning, for profit planning and analysis and for merger/acquisition studies.

  - The economics departments of capital and mutual fund companies use FERC for security analysis, market analysis and statistical studies.

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- The director of research for brokerage houses uses FERC for industry statistical studies related to securities analysis.

- The comptroller is a user of FERC-based management information systems, some of which are tailored to the specific type of institutional investor.

● Manufacturing Corporations (Fortune 500):

- There are a large number of existing and potential users in industrial corporations.

- The director of market research utilizes the services for market forecasting, product forecasting, and market allocation studies.

- The management scientist (operations research) utilizes the services for corporate studies, such as price analysis, product mixing and blending studies, scheduling analysis, and site location.

- The corporate economist of large corporations may use these services to supplement, or in place of, econometric consulting services.

- The financial vice president will use the services for merger and acquisition studies, financial investment evaluation, and executive financial reporting systems.

- The director of corporate planning will use the services for long-range planning activities, for profit planning and analysis.

- The director of marketing uses the services for sales forecasting and for product and sales reporting information systems.

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EXHIBIT V-3

FINANCIAL AND ECONOMIC REMOTE COMPUTING SERVICES (FERC)
CURRENT USERS & SOME TYPICAL APPLICATIONS

TYPE OF ORGANIZATION	USERS WITHIN ORGANIZATION	APPLICATIONS
Commercial Banks	Financial V.P., Director Corp. Planning	Profit Planning
	Comptroller	Financial Information Reporting, MIS
	Money Managers	Portfolio Maintenance and Reporting
	Management Science	Corporate Information Systems, Customer Systems
Manufacturing Companies	Financial	MIS
	Market Research	Site Location, Product Forecasting, Market Allocation Studies
	Management Science	O/R, Price Analysis, Product Mix Studies, Scheduling
	Corporate Planning	Acquisition/Merger Studies, Profit Planning, Long Range Planning
	Marketing	Sales Forecasting, Product & Sales Reporting Information Systems
Government	Comptrollers	Financial MIS
	Employee Pension Funds	Portfolio Maintenance, Analysis & Reporting

EXHIBIT V-3

(Continued)

TYPE OF ORGANIZATION	USERS WITHIN ORGANIZATION	APPLICATIONS
Thrift Institutions	Comptroller	Financial MIS, Industry Analysis
	Financial V.P.	Merger/Acquisitions Studies
	Corporate Planning	Profit Planning and Evaluation
	Market Research	Housing Market Studies
Institutional Investors	Financial V.P.	Investment Planning
	Economists	Market Analysis, Statistical Studies
	Comptroller	MIS for Investors
	Research	Analysis of Securties, Commodities, Bonds & Options

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- Governments:

  - Federal, state and local governments are users of these services.

  - Managers of funds use these services in conjunction with employee pension fund analysis.

  - The heaviest users of FERC in the Federal Government are found in:

    . The Federal Reserve,

    . Department of Commerce,

    . Department of Defense,

    . Office of Management and Budget,

    . Federal Home Loan Bank.

C   DATA BASE SUBSCRIPTION SERVICES (DBS)

- The marketplace is widely divided. There are more than 15 companies offering one or more types of economic and financial data bases. No single vendor holds more than 20% of the marketplace (see Exhibit V-4).

- Over 80% of RCS-related DBS revenues come directly from end-users, either through direct customer billings or "passed on" by the RCS vendor. The balance of the revenues comes from RCS vendor license fees.

- The need for new financial and economic data bases appears to be unlimited. In particular, there is strong demand for historical data bases which are aggregated by subsectors; regional, state, and industry aggregations.

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EXHIBIT V-4

DATA BASE SUBSCRIPTION REVENUES

DERIVED FROM REMOTE COMPUTING SERVICES

DATA BASE VENDOR/NAME	SERIES SIZE	# OF SUB-SCRIBERS	ESTIMATED 1976 DBS REVENUES ($M)
BANK OF AMERICA (BAMACS)	2200	60	.45
CHASE ECONOMETRICS, INC. (CHASE)	67000	320	.80
DATA RESOURCES, INC. (DRI)	50000	300	.70
FEDERAL RESERVE BANK, SAN FRANCISCO (FRBSF)	3600	50	.03
KENT ECONOMIC ASSOCIATES, INC. (KEA)	15000	20	.02
REMOTE COMPUTING CORPORATION (MERLIN)	13200	60	.08
MERRILL LYNCH ECONOMICS (MERRILL LYNCH)	8000	80	.40
NATIONAL BUREAU ECONOMICS RESEARCH (NBER)	2500	240	.23
INVESTORS MANAGEMENT SCIENCES (COMPUSTAT)	3500	200	.50
SECURITY PACIFIC NATIONAL BANK (SPNB)	15000	50	.16
TELSTAT SYSTEMS, INC. (TELSTAT)	12200	600	.70
ARNOLD BERNHARD AND COMPANY (VALUELINE)	3000	200	.70
WHARTON ECONOMIC ASSOCIATES (WEA)	14700	40	.10
PREDICASTS, INC. (PREDICASTS)	20000	40	.20
INTERACTIVE DATA SERVICES, INC. (IDSI)	60000	400	.93
TOTAL			6.00

INPUT

• In terms of end user expenditures, the total dollars spent for data
   base access via remote computing are split:

   - 90% for FERC (e.g., $51 million in 1976)

   - 10% for DBS (e.g., $6 million in 1976)

   Thus, the "pull through" revenues to the RCS vendor from data base
   related services constitute the great majority of its income for
   data bases.

• In competitive situations, the reasons users gave for selecting one
   data base over another were:

   - Scope

   - Accuracy

   - Timeliness (update frequency)

D. FINANCIAL INQUIRY SERVICES (FIS)

• The market is currently serviced by three primary vendors (see
   Exhibit V-5).

   - Bunker-Ramo with a fluctuating 42% of the market

   - Quotron Systems with an increasing 33% of the market

   - GTE Ultronics with a decaying 25% of the market

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EXHIBIT V-5

FINANCIAL INQUIRY SERVICES (FIS)

SALES BY VENDORS

COMPANY	MARKET SHARE (%)	TERMINALS INSTALLED (UNITS)	SALES 1976 ($M)	1976 GROWTH RATE (%)
Bunker-Ramo	42	25,000	34	8
Quotron Systems	33	20,000	26	20
GTE/Ultronics	25	15,000	20	-5
Totals	100	60,000	80	8.5

INPUT

- The users are exclusively money managers:

  - Brokerage houses   - 75% of the market

  - Institutional investors - 20% of the market

  - Large corporations   - 3% of the market

  - Governments   - 2% of the market

- All three major vendors offer a total service consisting of extensive communications networks, special purpose display terminals, data bases, remote computing systems, and inquiry software.

- The services are tied directly to the nation's financial exchanges: stock, commodities, bonds, options, and money instruments.

- The FIS business has a relatively slow growth rate but the potential for expanded and related services may be substantial because many FIS buyers are also ECS and FERC customers.

- Another largely unexploited potential growth area derives from the fact that users would like to set up joint ventures with vendors to enable cross-transfers of (FIS) data with in-house information systems.

- Consolidations, acquisitions, and mergers are still taking place among some user organizations, particularly in the brokerage field. This will result in fewer but larger clients who will be more sophisticated users.

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•   The primary factors in service selection in descending order of importance are:

-    system reliability

-    system maintenance (particularly maintenance response time)

-    system features (i.e., dual screen, news service, multiple markets)

-    cost.

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VI.   MARKETING AND TECHNICAL REQUIREMENTS

VI. MARKETING AND TECHNICAL REQUIREMENTS

A. MARKETING REQUIREMENTS

1. ECONOMETRIC CONSULTING SERVICES (ECS)

o   The basic vendor requirement for selling ECS is to have a highly qualified staff of consulting economists to interact with their client counterparts.

-   Staff may be in-house.

-   Vendors can arrange for support from university-associated people.

o   Economists must be supported by:

-   Good set of printed report services since some of the client base is not on-line.

-   Accurate national forecasting models. These are often developed by the economist himself.

-   Reliable, timely data bases of suitable scope for the applications served.

-   Remote computing system equipped with suitable data base access and analysis software.

2. FINANCIAL AND ECONOMIC REMOTE COMPUTING SERVICES (FERC)

• FERC vendors are basically selling 'convenient' access to a data base(s) at a price. The most successful vendors will offer:

- A wide choice of data bases
- Powerful and easy-to-use access tools
- A network with a fee structure minimizing the cost to the user
- Technical assistance by MBA-level management scientists qualified in the specific industries they support.

• Because of the relative heavy use (average 3.5 hours/day/user) communications costs must be minimized. Local dial-up or private line communications service is a necessity.

• Most users develop their own models. Therefore, it is not necessary to provide sophisticated econometric models, but vendors who offer a comprehensive set of model building routines and software will have a competitive advantage.

3. FINANCIAL INQUIRY SERVICES (FIS)

• The key to retaining FIS clients is system reliability. Brokers can lose business if they are not immediately responsive to their customer inquiries. Reliable terminals and networks and an extensive national field service organization are a prime requirement.

• Apart from the reliability question, flexibility and display features are the only items separating one service from another.

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● Increasingly, the ability to interface the vendor network to the user's in-house network for data transfer is a desirable selling feature.

● Salesmen must be well versed in financial market instruments and understand the changing financial market structure.

B. TECHNICAL REQUIREMENT

1. ECS, FERC, DBS REMOTE COMPUTING

a. TERMINALS

● Nearly all data base work is conducted on an interactive basis. On rare occasions, for example, developing month-end financial statements, deferred run or RJE can be used. Users, however, show a distinct preference for interactive operation.

● Two types of terminals are in general use:
- keyboard/printer
- CRT

● Keyboard/printer terminals should have wide carriages (132 characters) for printing reports which are compatible with high speed printer output (i.e. "lots of columns"). A clear, legible type font is a necessity since direct reproduction for enclosure with executive reports is a common requirement.

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● The majority of users require impact printing for multiple copies. The "Diablo" head with its graphic capabilities is the preferred type. Some users will accept non-impact printers.

● Most users were reasonably satisfied with 30 cps print speeds. Some state they were looking forward to using 120 cps as soon as it became economical to do so.

● CRT terminals should have wide screens and display at least 3000 characters. CRTs are far less common than keyboard/printer terminals, but they are found in some executive offices. Because of the need for rapid display generation, high speed transmission is required whenever CRTs are used. (For FIS they are mandatory).

● Users indicate little interest in using intelligent terminals.

b. RESPONSE TIME

● As mentioned, econometric and financial data base related programs are run principally in an interactive mode, which imposes certain requirements on the system response time in order to perform to user's satisfaction. Although it was difficult to obtain precise measures of response time because they are so problem-dependent, users were generally satisfied if the following performance was achieved:

INPU

APPLICATION	RESPONSE TIME
Program and data entry	"Immediate"
Data series request	1 second
Analysis (e.g., correlations, regression)	5 seconds
Forecasting runs	2-4 minutes
Complete financial reports	10-20 minutes

c. USER CHARACTERISTICS

●   SHIFT: The typical user is an economist or management scientist who uses the terminal on prime (first) shift an average of 3.5 hours per working day.

●   FREQUENCY: Most users will be on-line nearly every day.

●   USERS PER TERMINAL: Each user tends to have his/her own terminal.

●   ATTITUDES: Users are very problem-oriented and care little about the system they are using.   They tend to get very "unhappy" over system malfunctions.

d. SOFTWARE

1.   FINANCIAL MANAGEMENT INFORMATION SYSTEM PACKAGE

●   Included in this software group are the software tools needed by users to develop and implement their own systems to use economic and financial data bases via remote computing.   These tools may include any or all of the following types of capabilities:

INPUT

- Data Collection:

    editing, formulating, validity checking

- Data Base Management System:

    Organizes data into files indexed for easy access and/or display.

    Used to build and maintain integrated financial, product, or

    accounting data.

- Report Generation:

    Permits easy formulating and generation of financial (typically

    row/column) reports. (GE's FAL, for example).

- Graphics:

    Organizes tabular data for graphic display of two selected

    variables.

- Financial Statement Preparation:

    Automates preparation of a company's financial statements

    including subsidiary consolidations.

● Packages may be industry or non-industry specific depending on client
base. Examples are:

- FISCAL-a generalized Financial Information System package by

    Rapidata.

- FINALIST-a money manager's package by ADP Network Services.

- PROPHIT II-a Financial Management Information System by the

    Service Bureau Company.

INPU

2.   DATA BASE ACCESS AND ANALYSIS SOFTWARE

• This software is provided to enable the user to access time series (or portions thereof) in order that he can conduct his own data analysis. The software allows the corporate economist, for example, to create his own forecasting model. Examples of such systems presently being offered are:

-    MODSIM offered by DRI

-    TSAM offered by Cyphernetics

-    PROBE offered by Rapidata

-    XSIM offered by IDC

-    EMS offered by NCSS

• Typical capabilities that may be included with data base access and analysis software include:

-    Manipulate time series

. Access   . Update

. Create   . Revise

-    Modeling routines

• Regression – linear, polynomial, stepwise

• Autocorrelation, covariance, spectrum analysis

• Compare and tally time series

• Lead/lag techniques

• Solve recursive and simultaneous equations

• Box-Jenkins forecasting techniques

INPUT

- Display and reporting routine

    • Tabular formulating

    • Graphics

3. FORECASTING MODELS

• As pointed out earlier, models are generally not required for FERC customers since they typically create their own. ECS vendors provide models usually developed by the economist providing the consulting service. If econometric models are provided, however, they must have the capability of both explaining past economic events and forecasting future economic conditions with "reasonable" reliability and accuracy.

• Two types of forecasting are usually required: short range covering up to two years (8 quarters) and long range covering 5 years or more (20 quarters).

• Typical models available now are summarized as follows:
    - National Economy - The econometric model of the U.S. economy forecasts from 80 to 300 variables.
    - Monetarist Models - Forecasts approximately 80 variables. Concentrates on financial marketplace.
    - Aggregate Models - Utilize data from industrial and federal (fiscal) sectors and breaks down aggregate results into over 300 forecast items.
    - Industry Models - These econometric models are aggregate models tailored to specific industries and are related to the industry specific data bases. Example are:

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- Insurance
- Lumber
- Petro Chemicals

- Regional Models - The models are aggregate models which utilize regional data bases.

- California Economic Forecast
  - UCLA
  - Economic Sciences (NCSS)

e. DATA BASES

● Historical Data Bases. The data bases contain time series of both national economic and financial data. The technical requirements of the data bases are:

- Scope - The data must be comprehensive both as to areas covered and the length of time period covered. For example, a historical securities data base must cover daily prices of all listed stocks, bonds, options, warrants, splits, dividends, highs, low, bid, asked, etc. (see Appendix A for a description of the sum of the IDC Analystics Data Bases).

- Accuracy - The data must be virtually error free. This requires that the source data be analyzed and properly edited as it is placed in the data base.

- Timely - The data must be placed in the data base and made available to subscribers immediately after it becomes available, at times on a daily basis.

- Time Period - At least twenty (20) years, or if more recent, as long as the data is available. The data should be stored weekly (when available) for 52 weeks, quarterly for 20 quarters and annually thereafter.

INPUT

- Storage Requirements - The immediate access (i.e., disc) storage requirement for an average size data base of 10,000 time series is approximately 200 million bytes.

- Forecast Data Bases. These data bases carry forecasts for from four (4) to twenty (20) quarters in the future.

    - They result from the economic forecast(s) produced by the vendor econometric model.

    - From one or more sets of input assumptions.

    - Used by subscribers on an inquiry basis.

    - The immediate access storage requirements for an average size forecast data base of 300 time series is 100,000 bytes.

- Regional Data Bases. These data bases have the historical data aggregated by regional areas.

    - Northeast, Far West, etc.

    - State--California

    - Storage requirements - The immediate access storage requirements for an average size regional data base of 10,000 time series is approximately 100 million bytes per region.

- Industry Data Bases. These data bases contain aggregate industry data for specific industry groups.

    - Petro Chemicals

    - Lumber

    - Storage requirements - The immediate access storage requirements for an average size industry data base of 2,000 time series is approximately 20 million bytes.

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APPENDIX A: INTERACTIVE DATA CORPORATION
              PRODUCT LITERATURE
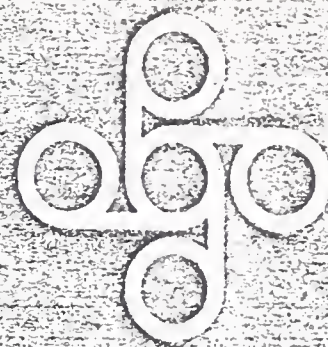
The ANALYSTICS computer system provides a comprehensive data retrieval and report generation service for the financial community. It is a powerful research and analysis facility which draws on a vast bank of security, financial statement, economic, and industry data. It employs large-scale IBM computers to prepare reports and analyses that are tailored to a user's requirements.

ANALYSTICS has two major components: *the data* itself and *the processing systems* which generate the analyses and reports. The magnitude of the data bank and the versatility of the processing systems provide the decision-maker with great flexibility in creating analyses and reports.

SECURITY DATA

The Security Master Data Base

- 18 items of security description and status information for over 42,000 corporate securities
- Security identification information including CUSIP® number, IDC symbol, and exchange ticker symbol with suffix
- Security classification information including SIC code, exchange code, and security type codes
- Security status information including date added to the IDC data bases, and first date of available prices
- Security names including three selections of primary names and secondary security description
- Descriptive information for bonds, including ratings, maturity dates, and amount outstanding

The PRICES Data Base

- Daily price (including high, low, close, or bid and asked) and volume data for over 12,000 equity and fixed income securities beginning in 1968
- FASTPRICE daily closing prices about one-half hour after the market closes for New York and American equity securities
- Daily prices and other data for all exchange-traded options from the inception of trading
- Theoretical Option Data, including theoretical option values, price and value deltas, volatilities and projected dividends
- Daily prices for more than 80 major indices including New York Stock Exchange, American Stock Exchange, NASDAQ, Dow Jones, Standard & Poor's, and the VALUE LINE indices
- Weekly prices for 110 Standard & Poor's Industry Indices beginning in 1961 and 140 VALUE LINE Relative Industry Indices beginning in 1967
- Latest 12 months earnings per share and indicated annual dividend

The Split & Dividend Data Base

- Daily stock splits and stock and cash dividends beginning in 1971 for more than 12,000 securities
- Split and dividend dates such as ex-dividend date, payment date, and holder-of-record date
- Dividends for over 100 Dow Jones and Standard & Poor's Indices

The MASTERPRICE Data Base

- Two years of weekly bid prices for over 15,000 unlisted Corporate Bonds and 7,000 non-NASDAQ OTC stocks
- Yields to maturity for over 15,000 unlisted Corporate Bonds

Interactive Data Corporation

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S208-K

The Monthly/Quarterly Data Base

- Quarterly earnings per share and monthly shares outstanding, beginning in 1973, for 6500 companies an over 100 indices

- Short interest for New York and American Stock Exchange companies

The I/B/E/S Summary Statistic Data Base

- Next two years' earnings forecasts, estimated monthly, for over 1500 companies, summarized from more tha 35 contributing institutional brokerage firms, beginning in 1973

- Supporting information for historical and estimated earnings per share, including earnings growth rate an stability

<div align="center">

FINANCIAL STATEMENT DATA

</div>

The COMPUSTAT® Data Bases

- The COMPUSTAT Industrial Primary, Supplementary, Tertiary and OTC Data Bases
  - 130 annual items from balance sheets, income statements and applications of funds statements for th past 20 years on 3500 industrial and financial companies
  - 25 quarterly financial items plus monthly price information for the past ten years on 2700 industrial an financial companies

- The COMPUSTAT Utility Data Base
  - 96 annual items from balance sheets, income statements, and company ratios for the past 20 years (150 key utility companies

The VALUE LINE Data Bases

- The VALUE LINE Industrial Data Base
  - Over 225 annual financial, statistical and ratio items, beginning in 1955, and 36 quarterly financial item beginning in 1963, for 1400 industrial, transportation, retail and utility companies

- The VALUE LINE Financial Data Base
  - Over 250 financial, statistical, and ratio items, beginning in 1959, and 36 quarterly financial items, begi ning in 1963, for 100 banks, insurance companies, savings & loans, and finance companies

- The VALUE LINE Business Line Data Base
  - 43 annual items covering sales, pretax income, SIC codes, descriptions and other items for 13 industrial, retail and utility companies, beginning in 1973

The EXSTAT Data Base

- Over 160 annual items from balance sheets and income statements, and related security data, for 200 European and Australian companies, beginning in 1971

The FDIC Data Base

- Descriptive information, FDIC number, and transit number for over 14,000 federally-insured commerc banks

- More than 175 annual and quarterly balance sheet items from the Report of Condition, beginning in 197

- Approximately 100 annual and semiannual income statement items from the Report of Income, beginning 1972

ECONOMIC DATA

CHASE ECONOMETRICS SERVICES

- Historical Data Bases
  - U.S. Data Base
  - Business Conditions Digest Data Base
  - Financial Data Base
  - International Data Base
  - Consumer and Wholesale Price Index Data Bases
  - Flow of Funds Data Base
  - Agricultural Data Base
  - Conference Board Data Base
  - Regional Macroeconomic and Industry Data Bases
  - Energy and Passenger Car Data Bases

- Forecast Data Bases
  - Short and Long Term Macroeconomic Forecasts
  - Financial and Inflation Forecasts
  - International and Foreign Exchange Forecasts
  - Short Term Industry Forecasts
  - Agriculture and Fertilizer Forecasts
  - Insurance Forecasts

- Forecasting Models

  The user may have access to the models that generate the Chase Econometrics economic forecasts.

- Report Services

  A number of current textual commentaries on the statistical releases of the U.S. Government, as well as the Chase economists' outlook on the economy

MERRILL LYNCH ECONOMICS, INC.

- Merrill Lynch Economics Data Bases
  - U.S. National Economic and Industry Data
  - U.S. Regional Data
  - Conference Board Data
  - Flow of Funds Data

- Economic Forecasts
  - Macroeconomic Forecasts of the U.S. Economy
  - Regional Forecasts of Income and Employment Indicators

- Econometric Forecasting Models
  - U.S. Econometric Forecasting Model which allows the user to produce forecasts using alternative assumptions
  - Online Industry Forecasting Models

- Online Bulletins
  - Online Bulletins summarizing Merrill Lynch Economics' current outlook for business and economic conditions

INDUSTRY DATA

NATIONAL ASSOCIATION OF HOME BUILDERS

- Short Term Regional Housing and Mortgage Model
- National, Regional and State Historic Data Base and Forecasts
- Online Report Services

DWIGHT JAFFEE AND KENNETH ROSEN

- Housing/Mortgage Long Run Model
- Historical and Forecast Data Base
- Online Report Services

WARD'S AUTOINFOBANK[s-m]

- Delivery, Production, Inventory and Shipment data for the automotive industry

THE PROCESSING SYSTEMS

ANALYSTICS Processing Systems access the above data bases and/or the user's own private data bases and analyze and prepare reports in a wide variety of formats. The processing systems are easy to learn and use, and generally require no previous computer experience.

XSIM[9]

XSIM provides data management, analysis, and display capabilities that can be applied to any of the ANALYSTICS data bases, allowing the decision-maker to perform easily a wide range of activities in the financial and economic areas. Used either as a conversational tool for problem-solving or as a programming language, XSIM can accomplish a variety of tasks, including:

- Portfolio valuation and analysis
- Forecasting using extrapolation, X-11 seasonalization, multiple and stepwise regression, Box and Jenkins time series techniques, and other sophisticated econometric methods
- Financial analysis including discounted cash flow, bond yield, internal rate of return, compound and least-squares growth rates
- Generation of camera-ready reports and graphs
- Development of customized special-purpose systems

XSCAN[s-m]

XSCAN is a securities analysis system expressly designed for investment analysts, financial researchers, and corporate planners who need immediate decision-making data. With XSCAN, analysts have full access to ANALYSTICS information, a broad universe of data on 5,500 companies and 42,000 securities. XSCAN screens and sorts this data, enabling analysts to:

- Look at the performance of an entire industry
- Compare the financial positions of different companies
- Review the financial history of a firm
- Perform statistical analyses and regressions
- Compute key values and ratios to identify profitable industries, promising investments, and good merger-acquisition candidates
- Measure many other key variables

The results of XSCAN analyses take the form of attractive, camera-ready reports, scatterplots, and histograms.

XDMS[s-m]

XDMS is an interactive, flexible, English-like data management language which can be used to:

- Define, build, and manipulate private data bases
- Access any of the ANALYSTICS securities and financial statement data bases
- Combine data from private files with ANALYSTICS data, to perform a variety of financial reporting and analysis functions

Examples of XDMS applications using ANALYSTICS data include Fixed Income Analysis, Credit Analysis, Options Accounting and Analysis, and Equity Analysis.

GRAPHICS

Interactive offers extensive, easy to use graphics facilities that can produce a wide variety of graphs, including scatter diagrams with optional regression lines and equations and histograms. The user controls axes, scales, grids, plot symbols, legends, colors (up to four are available), and other details. The user may access data from any of the ANALYSTICS financial and economic data bases.

Special Accessing Routines

Interactive also provides special accessing routines which can be incorporated into conventional FORTRAN, COBOL, PL/I, VSBASIC, and Assembly Language programs to access all but the economic and industry data bases.
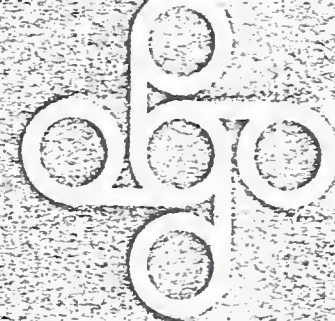
XSIM®

XSIM, a system for information management and analysis, has been applied to a wide range of activities in financial and economic areas, e.g.,

- Financial analysis
- Economic modeling
- Corporate planning
- Budget and control systems
- Industry analysis
- Product line forecasting
- MIS systems
- Inventory systems
- Statistical analysis

XSIM is a flexible, easy to use, conversational system which also offers a complete programming capability. This unique system integrates complete data analysis and data display capabilities with access to private or public data bases, including economic, financial, and corporate information. The major components of the system are described below.

DATA ANALYSIS

XSIM is a complete analysis language offering leads, lags, differencing, percent change, logarithms, exponentiation, functions, logical operators for IF...THEN...ELSE comparisons, and the standard arithmetic operators.

The language can be employed in the following areas:

General Analysis

These routines include screening and sorting; summary statistics such as correlations, growth rates, means, variances, totals; financial measures such as yields, discounted value, rates of return, betas; as well as routines for converting data from monthly to quarterly, from time series to cross-sectional, or from one format to another.

Modeling and Simulation

The system contains a complete simulation capability which is applicable to a wide range of business and economic activities such as budgeting, pro-forma analysis, financial planning, and economic forecasting.

The system is capable of solving nonlinear equations, which can include discontinuities.

Equations can be in any order; the solution procedure automatically rearranges multi-equation models for optimum efficiency.

Models can be constructed and edited using simple commands to represent all types of accounting, production, marketing, financial and economic relationships.

	1974	1975	1976	1977
	Income Statement			
Net Sales	$ 1,000,000	$ 700,000	$ 1,100,000	$ 1,400,000
Cost of Goods Sold	850,000	755,000	935,000	1,190,000
Gross Profit	$ 150,000	$ (55,000)	$ 165,000	$ 210,000
Interest	18,000	22,875	15,058	5,487
Pre-tax Profit	$ 132,000	$ (77,875)	$ 149,942	$ 204,513
Income Taxes	53,360	(41,796)	71,972	98,166
Net Profit	$ 68,640	$ (45,279)	$ 77,973	$ 106,347
	Balance Sheet			
	Assets			
Cash	$ 100,000	$ 100,000	$ 100,000	$ 100,000
Fixed Assets	500,000	500,000	500,000	500,000
Total Assets	$ 600,000	$ 600,000	$ 600,000	$ 600,000
	Liabilities and Net Worth			
Long Term Debt	$ 200,000	$ 245,279	$ 167,308	$ 60,962
Retained Earnings	400,000	354,721	432,691	539,038
Total Liabilities and Net Worth	$ 600,000	$ 600,000	$ 600,000	$ 600,000

The financial model below illustrates the XSIM modeling language. This simple set of equations was used to produce the pro-forma financial reports shown on the right.

```
MODEL XMPLMOD
CGS     = IF (.85 * SALES) GT (.9 * CGS(-1))
          THEN (.85 * SALES)
          ELSE (.9 * CGS(-1)) ,
GROSSPR = SALES - CGS ,
INT     = .09 * DEBT ,
PRETXPR = GROSSPR - INT ,
TAXES   = .48 * PRETXPR ,
NETPR   = PRETXPR - TAXES ,
RETEARN = RETEARN(-1) + NETPR ,
CASH    = CASH(-1) + NETPR - DEL(DEBT)
TOTASST = CASH + FIXASST ,
TOTLIAB = DEBT + RETEARN ,
DEBT    = IF NETPR GE DEBT(-1) THEN 0
          ELSE DEBT(-1) - NETPR ,
```

Time Series Analysis

Time series operations, such as exponential smoothing, autoregression, extrapolation and interpolation, and seasonal adjustment (using the X11 variant of Census Method II) are included. Advanced econometric routines are also available for sophisticated model-building projects.

Regression Analysis

The complete and easy to use regression facility includes ordinary least squares, autoregressive correction methods, and distributed lag routines.

All regression results and equations can be saved automatically for further analysis or for the production of tables, graphs, and reports.

DATA BASES

XSIM has facilities for a full range of data base applications.

Private Data

Data may be entered and edited on-line or via cards, tape, or disk files. Three types of data can be stored and processed: standard numeric, alphabetic, and high precision decimal. Formats are unrestricted, and data types can be freely intermixed. It is easy to share data with authorized users.

Public Data

Economic, corporate, and financial data bases offered by Interactive's ANALYSTICS® service are accessible by XSIM. Therefore, all XSIM analytical and display capabilities can be applied to the Interactive public data bases, which can be augmented automatically with a user's private XSIM data.

DATA DISPLAY

A full range of display capabilities is available for producing reports, graphs, and tables.

Report Generation

The XSIM report generator is simple and automatic for fast, easily generated output, yet is sufficiently flexible to meet sophisticated format requirements.

Reports and tables are automatically formatted. There is flexible control of indentation, commas, underlinings, titles, subtitles, spacing, decimals, footnotes, dollar signs, and other details. The three XSIM data types are also handled automatically.
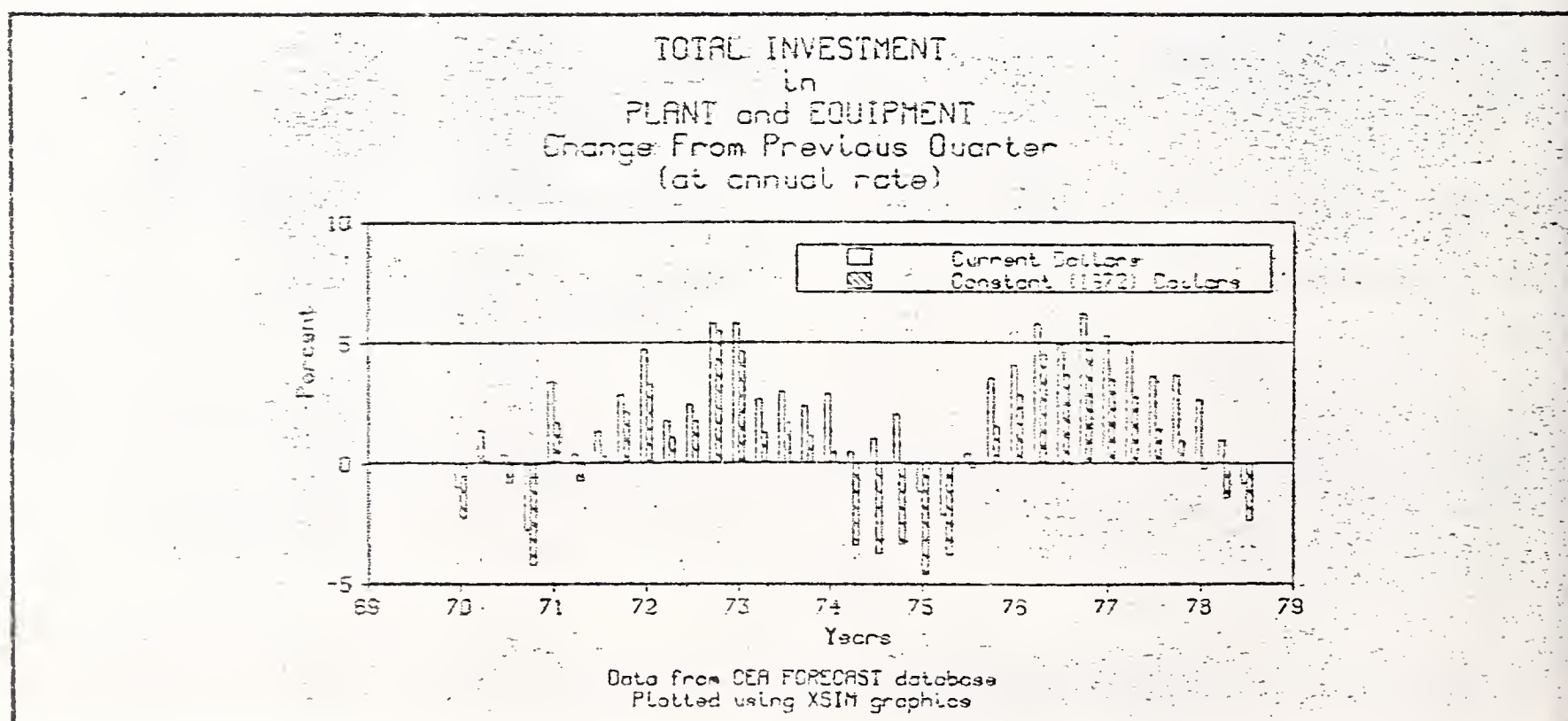
Graphs

The graphics facility is easy to use and produces line graphs, bar graphs, and scatter diagrams. The user controls axes, scales, grids, plots, symbols, legends, titles, annotations, and other details. Moreover, the user can have the graphs produced on a typewriter terminal, CRT, or four-color flatbed plotter.
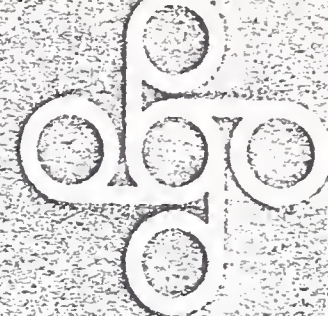
XSIM SYSTEM BUILDING

XSIM is also a complete programming language for building customized interactive systems. Such systems can be built in XSIM significantly faster and at lower cost than by using standard programming languages.

TRAINING AND SUPPORT

Client training is provided by introductory and advanced XSIM classes with follow-up support by Interactive and Dynamics Associates personnel who are always available to answer XSIM questions. Dynamics Associates also provides consulting services to assist in the definition and development of data base management, economic forecasting and financial modeling applications.

TOTAL INVESTMENT
in
PLANT and EQUIPMENT
Change from Previous Quarter
(at annual rate)

Data from CEA FORECAST database
Plotted using XSIM graphics

XSIM and ANALYSTICS are registered servicemarks of Interactive Data Corporation.

XPORT ®

XPORT is a Portfolio Management Information and Performance Measurement Service for money managers and corporate pension fund officers. XPORT combines the resources of *Interactive's* international online computer system and vast financial data bases with extensive portfolio accounting, performance measurement, and analytical reporting services.

XPORT gives the user immediate online access to all portfolio data from a time-sharing terminal and optionally provides a low cost scheduled production service where *Interactive* performs all updating and report generation tasks for the user. XPORT offers hundreds of report formats and tailored appraisal reports to meet individual preferences. The user can also use XDMS, COBOL, FORTRAN, Assembly Language, PL/I, and XSIM® to access private portfolio data and over 5 million series of financial and economic data available in *Interactive's* ANALYSTICS® service.

PERFORMANCE MEASUREMENT

- Dollar- and time-weighted rates of return
- Flexible asset component definitions
- Variable time period definitions
- Many reports available, including growth rate "triangular" performance reports and continuous line, 4-color performance graphs
- Comparisons with multiple standard market indices
- Comparisons with user-defined model portfolios
- Comparisons with "buy and hold" or other alternative investment strategies
- Historical performance analysis
- Aggregate or individual portfolio measurement
- Market cycle performance comparisons
- Mathematics prescribed by Bank Administration Institute
- Statistical analysis and graphics available through XSIM

PRICING

- Largest universe of prices available
- Daily closing prices for 15,000 New York, American, NASDAQ, and Regional securities, including common stocks, rights, warrants, listed bonds, and options
- Daily historical prices since 1968
- Prices and security holdings automatically adjusted for splits and dividends
- 33,000 corporate and government bond prices via MASTERPRICE
- 1,500,000 municipal bond prices
- Mutual fund closing prices for New York and AMEX securities and Municipal Bonds within one half-hour after the market closes.
- Custom pricing services available.

PORTFOLIO ACCOUNTING

- Full range of appraisal reports, activity journals, cash ledgers, cross-reference reports, and audit trails
- Back-dated appraisal capabilities
- Completely integrated cash and security accounting
- Gain/loss ledgers and tax worksheets
- Tax cost and average cost accounting
- Broker commission analysis
- Dividend and interest income audit reports
- Industry classifications supplied automatically or specified by user
- Aggregate reporting by portfolio manager, division, company, investment group, or other user-defined grouping
- Online MINI reports for quick status information
- Automated adjustment of fractional shares

SERVICE

- Free training programs
- XPORT Technical Consultants available locally in major cities for customer assistance
- Complete user documentation
- Contract programming services for customized modifications
- Remote medium-speed printers for output in regional and branch offices

Interactive Data Corporation

TIME-WEIGHTED AND DOLLAR-WEIGHTED PERFORMANCE MEASUREMENT

PERFORMANCE GRAPHICS

OVER 150 APPRAISAL REPORTS FORMATS

TRANSACTION AND GAIN/LOSS JOURNALS
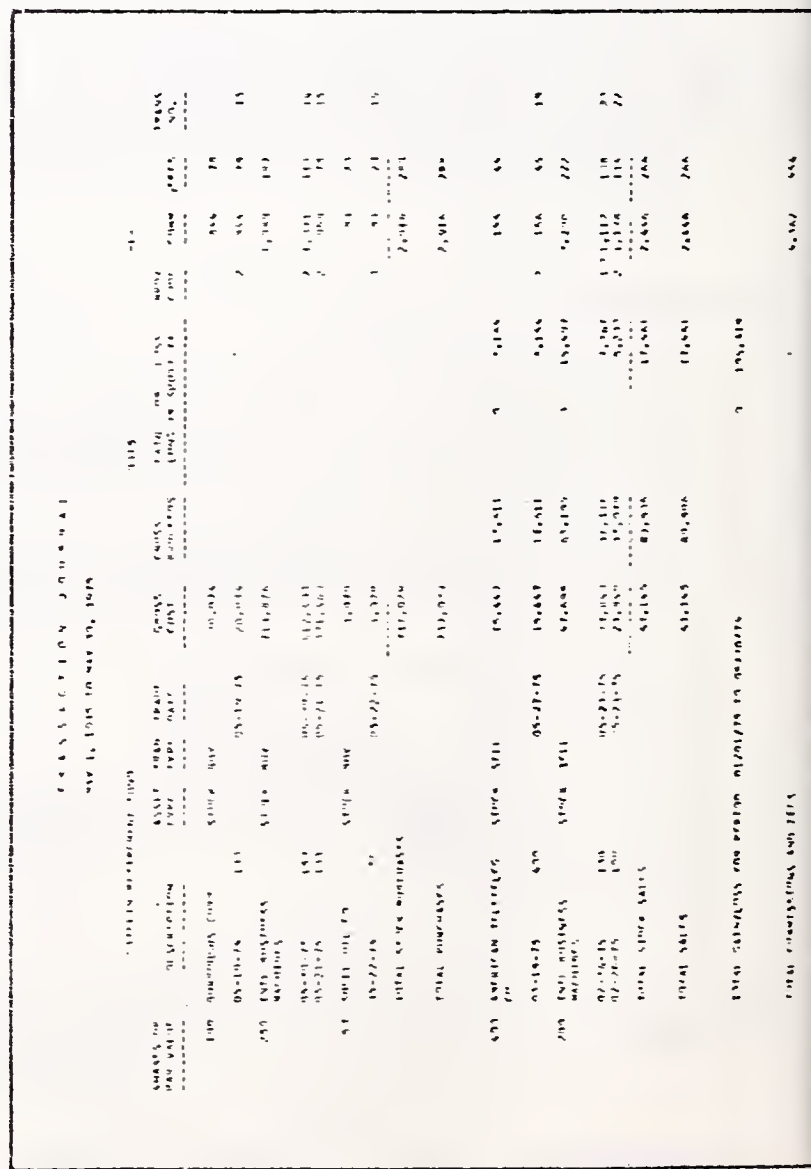
XDMS. S-M
OVERVIEW

Interactive Data Corporation
The Data Utility

XDMS* combines the resources of:

- Sophisticated time-sharing software
- An international communications network
- A virtual memory IBM System/370 Model 168

To produce a data management system that:

- Is conversationally oriented
- Has powerful English-like commands
- Contains complete facilities for creating, modifying, and updating data
- Provides comprehensive data retrieval commands for ad hoc reports, production oriented reports, online queries
- Supports existing sequential and indexed sequential databases
- Includes an application development language

Resulting in the following user benefits:

- Easy to use
- Quick turnaround for immediate needs
- Economical to use
- Minimum training required
- Eliminates dependency on other programming languages
- Offers a variety of data retrieval capabilities to let the user select the most efficient method for satisfying reporting requirements
- Does not require a conversion of existing data bases
- Reduces application development time
- Permits a wide range of personnel to easily and efficiently utilize the power of a large-scale IBM System/7

XDMS is a general purpose data management system designed to manage both large and small data bases simand efficiently in a conversational time-sharing environment. By "managing" data we mean describing characteristics of the data, retrieving data in ways ranging from a simple display of individual data items sophisticated report, creating data (actually entering the information), and modifying the data to keep it up to d

XDMS provides the means to define the characteristics of a collection of data and to use that definition fo unlimited number of applications. The user can define data that already exists in computer readable form (d tape, or cards), or new data can be created through XDMS commands. XDMS provides for the easy screenir data — that is, for a particular application the user can choose to retrieve only the data that meets specified cod tions. For any data base that already exists, the user can quickly locate and display specific information and d duce reports. Data can be kept up to date easily through XDMS maintenance commands which allow the us add new information, delete outdated information, and modify existing information.

XDMS is available through Interactive Data's time sharing system, which provides the user — through a termin his office — with the resources of an IBM 370 computer, as well as a high speed printer, direct access storg tape drives, and card processing facilities.

*XDMS is a servicemark of Interactive Data Corporation.

CREATING A DATA BASE

One of the key features of XDMS is the ability to describe a collection of data as a data base only once, and to use that description for an unlimited number of applications. The data may already exist on disk, cards, or tape; new data bases can also be created through XDMS commands. Additionally, Interactive's ANALYSTICS®* data bases can be accessed through XDMS, providing a wide variety of financially-oriented information.

Data Base Definition

The DEFINE DATABASE command is used to describe the characteristics of a data base. Each item of information is described as an *element*, and related elements are grouped together in a *segment*. The format of a simple personnel file could be represented as follows:

```
     element
|-----------|
|-----------------------------------------------------------------------------------------|
| employee| last| first| street| town| state| zip  | branch| pay     | salary |
| number  | name| name |       |     |      | code |       | status |        |
|-----------------------------------------------------------------------------------------|
|--------------------------------segment----------------------------------------|
```

The segment definition describes the format of the collection of information for each employee. Each employee is represented by one occurrence of the segment, which contains values for each of the elements.

The following example shows a data base definition for an employee data base.

```
DEFINE DATABASE EMPLOYEE                          Name of data base
ORGANIZATION SEQUENTIAL                           How data is to be stored
DATA AREA 'COMPANY FILE'                          Where data will be stored
ACCESS (RETRIEVE,MODIFY,CREATE);                  Access privileges
SEGMENT EMPLOYEE-SEG;                             Segment name
01 EMPLOYEE-NUMBER                                Element name
     PICTURE 9(5)                                 Defines size and type of data
     HEADING (EMPLOYEE,NUMBER)                    Two-line column heading for reports
     ALIAS (EMPL-NO)                              Alternate name for EMPLOYEE-NUMBER
     SUPPRESS TOTALING;                           Suppression of automatic totaling
01 NAME;                                          of employee numbers on reports
     02 LAST-NAME
          PICTURE X(15);
     02 FIRST-NAME
          PICTURE X(12);
01 ADDRESS;
     02 STREET
          PICTURE X(15);
     02 TOWN
          PICTURE X(12);
     02 STATE
          PICTURE XX;
     02 ZIP-CODE
          PICTURE X(5);
01 BRANCH
     PICTURE XX;
01 STATUS
     PICTURE X;
01 SALARY
     PICTURE 9(5)
     EDIT PICTURE $ZZ,ZZ9;
END;                                              Data editing for external display
```

ANALYSTICS is a registered servicemark of Interactive Data Corporation.

GENERATING REPORTS

XDMS has a powerful report facility that can be used to produce a wide variety of reports. XDMS will automat[..] format the report or the user can override the automatic formatting and provide his own headings, footings, [..] placement of data values, and totals. In addition, XDMS provides screening and sorting facilities which allo[..] user to process only the data that meets specified selection criteria and to print output data in any ord[..] chooses.

Report With Automatic Formatting

The following report shows the employee numbers, names and salaries of all the salaried employees in the Bo[..] branch of the sample data base. The information is printed in order of increasing employee number.

The SELECT command is used to specify that only the salaried employees (STATUS='S') in the Boston br[..] (BRANCH='B') are to be processed:

COMMAND: select employee when status= 's' and branch='b';

In the REPORT command the user specifies the data items to be printed and the order in which the informati[..] to be sorted. XDMS automatically aligns the data, provides a page heading and column headings, and t[..] numeric data items.

```
COMMAND: report print (employee-number, last-name, first-name, salary)
PRINT OR REPORT SPECS: sort on (employee-number);
SET PAPER; HIT RETURN
```

```
MAY 12, 1976   12:13:33                    PAGE     1        Page heading

EMPLOYEE
 NUMBER        LAST NAME         FIRST NAME      SALARY       Column headings
--------    ----------------    ------------    -------

 29088      PEREZ               MARIE           $  1,675
 30552      PERKINS             OSCAR           $  1,275
 31352      WASSERMANN          JAMES           $  1,500
 46700      WALKER              SAMUEL          $  1,125
 46891      PRATT               MARGARET        $  2,200
 48222      PLANTE              FREDERICK       $  1,550
 51667      BOLTON              BARBARA         $  1,550
 54923      DWYER               MARTIN          $  1,800
 58839      HUTCHINSON          SHEILA          $  1,275
                                               --------
GRAND TOTAL                                    $13,950      Total for numeric element
```

Report With User-Specified Formatting

XDMS permits the user to easily override the default features of the report command in order to control the en[..] format of the report. This example shows a report that prints the names and annual salaries of all employees w[..] are not in the Boston branch, grouped by branch. The user provides the page heading, page footing, and colu[..] headings, and, through the designation of BRANCH as a controlling data item, the report is divided into groups[..] related information.

The user also specifies an arithmetic expression to compute annual salary from monthly salary.

The report definition is stored in an XDMS file called SALREP so that the report can be executed by typing SALREP.

```
SELECT EMPLOYEE WHEN BRANCH NE 'B' AND STATUS='S';
REPORT
      PRINT (LAST-NAME)   HEADING (LAST, NAME)          Two-line heading rather than
      PRINT (FIRST-NAME)  HEADING (FIRST, NAME)         normal one line
      PRINT (SALARY*12)                                 Arithmetic expression
            HEADING (ANNUAL, EARNINGS)
            EDIT PICTURE $ZZ,ZZZ TOTAL
      SORT ON (BRANCH,LAST-NAME,FIRST-NAME)
      CONTROLS ARE (BRANCH)                             Data grouped by branch
      PAGE HEADING                                      User-specified page heading
            CENTER                                      Centers page heading
            PRINT ('ANNUAL EARNINGS')
            SKIP 1                                      Skips one line
            CENTER
            PRINT ('BY BRANCH')
      PAGE FOOTING                                      User-specified page footing
            SKIP 2
            PRINT (&DMSDATE)                            Use of XDMS date
            RIGHT JUSTIFY
            PRINT ('PAGE',&DMSPAGE) ;                   Use of XDMS page count
```

The report is produced by typing the name of the XDMS file.

```
COMMAND: salrep
SET PAPER; HIT RETURN
```

LAST NAME	FIRST NAME	ANNUAL EARNINGS	
	ANNUAL EARNINGS BY BRANCH		Page heading
			Two-line column heading
C			
CLOUGH	ARTHUR	$10,800	
CRANDALL	BABE	$14,400	Data grouped by branch
NORDSTROM	ALAN	$16,800	
TOTAL C		$42,600	
DC			
PARKER	SHIPLEY	$16,200	
YATES	RANDOLPH	$12,900	
TOTAL DC		$29,100	
NY			
CUTHBERTSON	NANCY	$15,300	
JONES	VIVIAN	$16,500	
SANTELLI	ROBERT	$15,600	
SNOW	HERBERT	$12,600	
TOTAL NY		$60,000	
SF			
BAKER	CARL	$13,200	
GREEN	PATRICIA	$17,100	
TOTAL SF		$30,300	

```
MAY 26, 1976              PAGE      1       Page footing containing
                                            date and page number
```
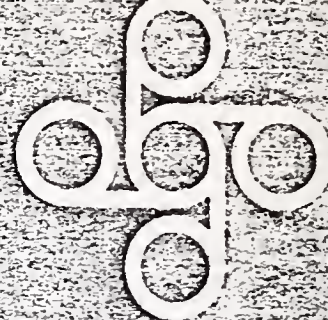
EXSTAT
A Computerized Company Data Base Service

EXSTAT is a new Data Base service from Extel Statistical Services Limited of London, which provides company information in a form suitable for processing and analysis by computer. The information is available on Interactive Data Corporation's time-sharing network.

EXSTAT initially covers 2000 U.K. and foreign companies but it is planned to increase this number as demand grows. Current coverage includes some 1200 British Quoted (Listed) Companies, 125 British Unquoted (generally privately-held or subsidiary) Companies, 425 Continental European Companies and 250 Australian Companies.

EXSTAT contains over 160 Annual Balance Sheet and Profit and Loss Account items for each company, going back in most cases to 1971. For each year it also gives Net Asset Value, Earnings and, for each security, Dividends. The Data Base is updated weekly, as soon as the latest information is received by Extel Statistical Services Ltd.

EXSTAT is a product of the EXTEL Group. The data is collected and edited by one subsidiary of the Group, Extel Statistical Services Ltd., and the computing side is handled by another, Extel Computing Ltd. In Europe, EXTEL has for more than a hundred years been known for the outstanding accuracy, reliability and timeliness of its financial services.

EXSTAT data is compatible with the data in the EXTEL Cards, which are produced by Extel Statistics and are widely used in the United Kingdom, coming from the same source and being handled by the same skilled team of editorial staff. It is designed to be complementary to these services.

EXSTAT is based on the concept that the financial and corporate communities are today international in their outlook. As a service with international coverage, EXSTAT is being marketed throughout the world, aided by the growth of a cost-effective, multi-national computer time-sharing service, such as Interactive Data's. EXSTAT can help you to take full advantage of these new international computing facilities.

EXSTAT is designed for major financial institutions (banks, stockbroking houses, trusts, insurance companies, investment advisory organizations and pension funds), for multi-national corporations, and for business schools and universities. It can be used by investment analysts, corporate finance departments, merger and acquisition specialists, corporate planners, credit controllers and many others in the corporate or academic sphere.

EXSTAT enables you to carry out rapid, up-to-date, cost-effective analysis in depth. You can construct your own specialized Data Bases bringing together elements from EXSTAT with data you have gathered yourself or obtained from other national and international Data Bases (Econometric, Price History, COMPUSTAT©, Value Line, etc.). You can apply your own analysis techniques and parameters to the data thus assembled and regularly updated, opening up entirely new possibilities for analysis and evaluation in the investment and related areas.

EXSTAT is available on a variety of contractual plans, ranging from an individual per access fee with no minimum charge to a yearly subscription fee, allowing unlimited access from any available source in any part of the world.

Full particulars are contained in the comprehensive *EXSTAT User Manual*.

Interactive Data Corporation provides a wide variety of facilities that may be used to analyze EXSTAT data, including the XSIM®, XSCANˢ⁻ᵐ, and XDMSˢ⁻ᵐ proprietary languages, an extensive graphics facility, and commonly used programming languages. The following examples illustrate two of many applications for EXSTAT data.

The first example, using XSCAN, ranks companies in the British brewing industry by sales, and reports various profitability statistics.

BREWERIES
UNITED KINGDOM
(POUNDS STERLING)

COMP	COMPANY	SALES 1976	COMMON EQUITY 75	TCT ASSETS 1975	NET INCOME 1976	AFTERTAX MARGIN	RETURN ON EQUITY	RETURN ON ASSETS
ALFA	ALLIED BREWERIES	895300000	308227000	704340000	30400000	3.43	9.86	4.32
BAHK	BASS CHARRINGTON	801700000	349300000	686900000	25900000	3.23	7.41	3.77
WHAV	WHITBREAD & CO	441569000	264684000	498902000	14101000	3.19	5.33	2.83
GU3F	GUINNESS(ARTHUR)SON & CO	413378000	95080000	268494000	20956000	5.06	22.04	7.81
GRGF	GREENALL WHITLEY & CO	85243000	54821000	87039000	4002000	4.69	7.30	4.60
VACS	VAUX BREWERIES	56550000	26423000	52549000	2194000	3.88	8.30	4.18
WOAH	WOLVERHAMPTON & DUDLEY BREWERIES	34857000	16854000	26710800	2472820	7.09	14.67	9.26
BUBS	BULMER (H.P.)	26313000	8572000	22320000	1103000	4.21	12.93	4.96
GRGL	GREENE KING & SONS	26198700	9135400	17282900	1430020	5.46	15.65	8.27
DAGJ	DAVENPORTS BREWERY(HLDGS)	19072000	6314010	11191700	670000	3.51	10.61	5.99
MAQF	MARSTON THOMPSON & EVERSHED	-17310400	13136400	16857700	1355570	7.83	10.32	7.19
BRLN	BROWN(MATTHEW)& CO	15657000	12160000	18768000	1231000	7.96	10.12	6.56
HIBV	HIGSONS BREWERY	15451000	10397500	14070900	750031	4.86	7.22	5.34
BOAG	BODDINGTONS BREWERIES	14931000	7090000	10801000	1356000	9.08	19.13	12.55
TOEY	TOLLEMACHE & COBBOLD BREWERIES	14200000	6660510	11547700	295156	2.09	4.43	2.56
YOBG	YOUNG & CO.'S BREWERY	12824700	7555810	12650700	519563	4.05	6.83	4.11
MALS	MANSFIELD BREWERY CO	12432900	8958490	11532200	1031440	8.26	11.51	8.94
DEGJ	DEVENISH(J.A.)& CO	11842000	5078080	7994610	645919	5.45	12.72	8.08
BOCZ	BORDER BREWERIES(WREXHAM)	8260530	4091990	5690990	365956	4.43	8.94	6.44
HAGC	HARDYS & HANSONS	8217530	5450340	7732250	701584	8.54	12.83	9.09
BUDU	BURTONWOOD BREWERY CO(FORSHAWS)	8110010	4648770	7547530	469022	5.79	10.09	6.21
MCFR	MORLAND & CO	6340570	4229040	5590280	305400	4.82	7.22	5.46
BUAG	BUCKLEY'S BREWERY	5227780	4235160	6224010	406076	7.77	9.59	6.52

The second example, which employs Interactive's XSIM graphics capability, displays components of expense for Braun AG, the West German subsidiary of Gillette, which manufactures various consumer goods.

BRAUN AG
COMPONENTS OF EXPENSE

COST OF GOODS SOLD
WAGES AND SALARIES
SELLING, GENERAL AND ADMIN
INTEREST
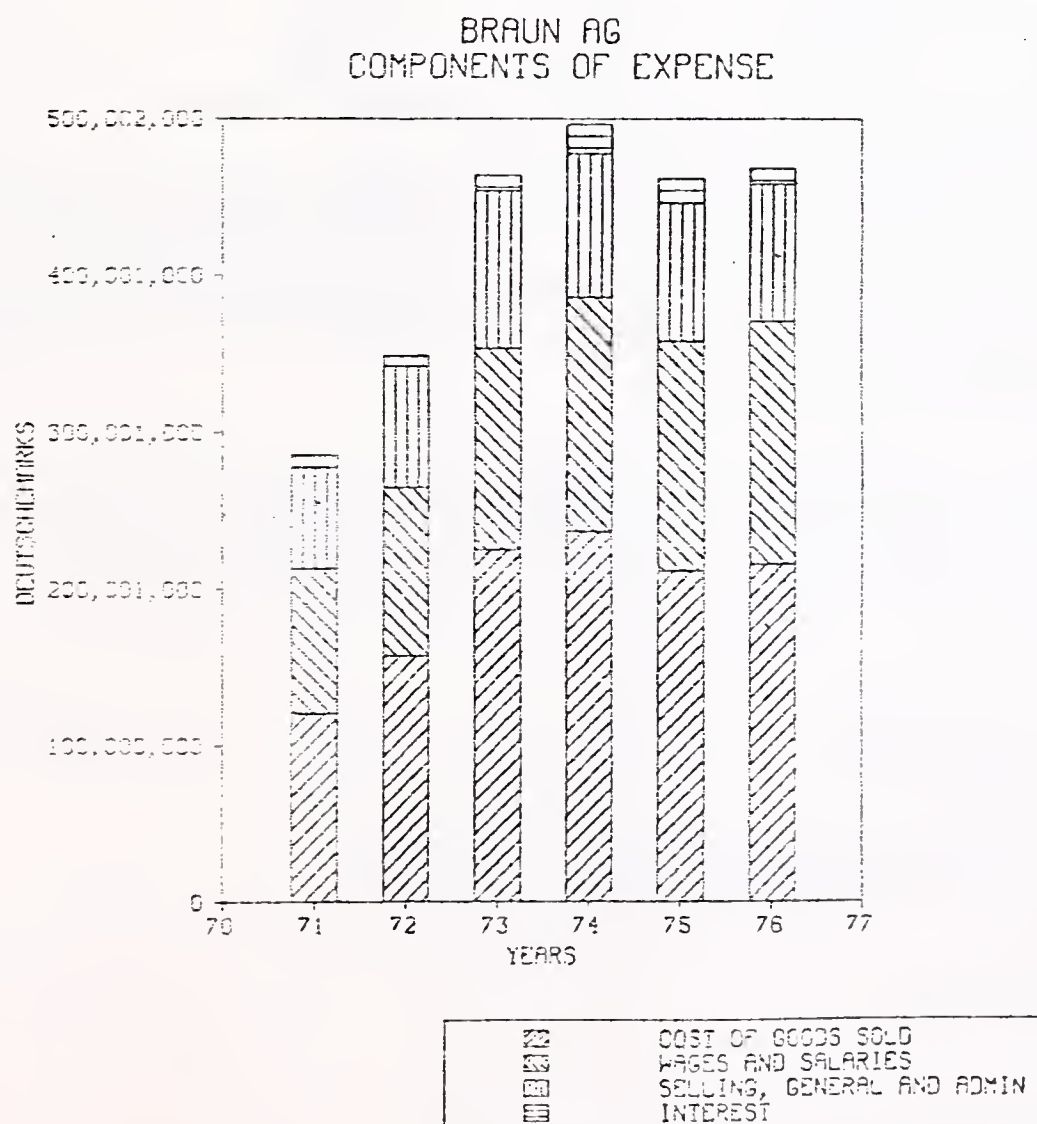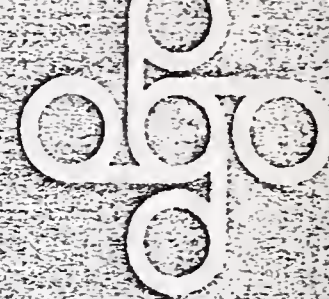
NATURAL GAS MODEL

The Natural Gas Model[1] is a large econometric model that forecasts the availability of natural gas and oil within the U.S. given regulated prices and other parameters. The model includes over 1,250 equations that describe nearly all aspects of the production, marketing, and distribution of natural gas. Developed at the MIT Energy Laboratory, it is by far the most detailed treatment available of this industry. The Model is jointly offered by Interactive Data Corporation and Dynamics Associates, Inc. of Cambridge, Massachusetts.

The Natural Gas Model is an extremely powerful planning tool for companies involved in the following activities:

- Production and distribution of natural gas, petroleum, electricity, and coal
- Petrochemical manufacturing
- Steel and aluminum production
- Furnace and boiler equipment manufacturing
- Appliance manufacturing

The Model forecasts through 1990:

- Production of natural gas and oil in each of 28 production districts in the U.S. Geologically similar districts are then aggregated into 8 large regions.
- Additions to natural gas and oil reserves in each production district and region
- Demand in each state for gas and oil by residential, commercial, and industrial users. The 50 states are then aggregated into 5 demand regions. The flow of gas from each of the 8 supply regions to each of the 5 demand regions is calculated and regional shortages can then be evaluated.
- Regional wholesale prices for natural gas

Many of the key policy variables and parameters that affect the generated forecasts can be changed by the user in conducting sensitivity analyses to study the impact of different FPC policies, world oil prices, and general economic conditions. Users can play the role of the Federal Power Commission and set new contract prices in each of the gas-producing districts. Examples of variables that can be manipulated by the user are:

- Wellhead price ceilings in each production region
- Rate of real growth in GNP
- Inflation rate in U.S.
- Rate of growth of pipeline capacity
- OPEC oil prices
- Prices of other fuels
- Leased offshore acreage.

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The model incorporates econometric relationships which describe drilling and discovery, production, sales to interstate pipeline companies, sales to industrial users, and sales to local gas utilities. In the oil sector, econometric relationships describe the economics of exploration and development, as well as wholesale demand for #2 home heating oil and #6 residual fuel oil. A separate submodel describes exploration and development activity for offshore natural gas and oil alone. Another submodel forecasts long-range general economic conditions; the user can replace this submodel with his own macroeconomic forecasts.

The Natural Gas Model can easily be accessed directly through XSIM[2], an easy-to-use conversational language for economic and financial analysis. Several auxiliary programs are available which make it easy for the user to input and change parameters, run the model, and produce reports (or graphs) similar to the ones illustrated here. Members of the Dynamics Associates consulting staff have been directly involved in the construction of the model at MIT and can offer consulting support on the use of the model and interpretation of results. Dynamics Associates can also assist users of the model in related econometric and financial modeling activities.

FORECASTS OF AGGREGATE GAS AND OIL VARIABLES
ASSUMPTIONS: CONTINUATION OF CURRENT FPC POLICY
$7.50 DOMESTIC OIL PRICE
"MEDIUM" ECONOMIC CONDITIONS

	1976	1977	1978	1979	1980
GAS RESERVES:					
DISCOVERIES	15,562,900	17,843,900	19,667,100	20,024,200	18,861,400
EXTENSIONS	10,343,300	11,010,300	11,893,300	12,671,800	12,970,000
REVISIONS	-815,820	-1,097,850	-1,376,820	-1,650,380	-1,951,660
TOTAL ADDITIONS TO RESERVES	25,090,300	27,756,300	30,183,600	31,045,600	29,880,700
PRODUCTION	25,480,500	27,478,100	28,793,800	30,203,400	31,795,400
TOTAL RESERVES	222,879,000	224,858,000	228,190,000	231,128,000	231,669,000
RESERVE/PRODUCTION RATIO	8.92	8.65	8.33	8.13	7.83
OIL RESERVES:					
DISCOVERIES	476,398	609,613	624,772	608,666	581,356
EXTENSIONS	563,521	566,996	593,681	603,223	604,274
REVISIONS	203,539	400,219	238,160	459,445	421,353
TOTAL ADDITIONS TO RESERVES	1,243,460	1,576,830	1,505,810	1,671,330	1,605,930
PRODUCTION	2,500,220	2,461,010	2,402,570	2,339,010	2,309,870
TOTAL RESERVES	20,392,400	19,951,900	19,480,400	19,243,500	18,957,100
GAS DRILLING ACTIVITY:					
SUCCESSFUL WELLS DRILLED	650	801	1,057	1,410	1,876
SUCCESS RATIO	0.0838	0.0979	0.1244	0.1661	0.2250
AVERAGE SIZE PER SUCCESSFUL WELL	23,955	22,282	18,762	14,204	10,893
OIL DRILLING ACTIVITY:					
SUCCESSFUL WELLS DRILLED	391	356	318	283	254
SUCCESS RATIO	0.0504	0.0435	0.0378	0.0333	0.0299
AVERAGE SIZE PER SUCCESSFUL WELL	1,219	1,714	1,963	2,150	2,295
TOTAL EXPLORATORY WELLS					
(SUCCESSFUL + UNSUCCESSFUL)	7,761	8,180	8,412	8,489	8,339
DEMAND:					
RESIDENTIAL/COMMERCIAL GAS	9,852,550	10,492,700	11,037,400	11,507,700	11,891,000
INDUSTRIAL GAS	19,817,700	21,568,500	23,385,600	25,080,300	26,855,000
LEASE AND PLANT FUEL	1,547,430	1,591,450	1,647,470	1,705,950	1,765,870
TOTAL GAS DEMAND	31,217,700	33,652,700	36,050,400	38,294,000	40,511,900
EXCESS DEMAND FOR GAS	4,737,220	6,174,540	7,205,800	8,090,500	8,805,460
NO. 2 HOME HEATING OIL	555,623	586,778	618,793	662,402	717,784
NO. 6 RESIDUAL FUEL OIL	1,103,940	1,157,220	1,248,310	1,354,990	1,481,650
PRICES:					
AVERAGE NEW CONTRACT GAS PRICE	49.85	54.92	60.03	65.12	70.22
AVERAGE WELLHEAD GAS PRICE	32.77	36.45	40.55	44.84	49.25
AVERAGE WHOLESALE GAS PRICE	51.50	55.82	60.58	65.58	70.64
AVERAGE WHOLESALE CRUDE OIL PRICE	7.37	7.89	8.43	8.97	9.50

UNITS:
QUANTITY OF GAS - MILLIONS OF CUBIC FEET
QUANTITY OF OIL - THOUSANDS OF BARRELS
PRICE OF GAS - CENTS PER THOUSAND CUBIC FEET
PRICE OF OIL - DOLLARS PER BARREL

[1]See P.W. MacAvoy and R.S. Pindyck, *The Economics of the Natural Gas Shortage (1960-1980)*. Amsterdam: North Holland Publishing Co., to be published in April 1975.

[2]XSIM is a servicemark jointly owned by Dynamics Associates, Inc. and Interactive Data Corporation.

HOUSING/MORTGAGE LONG RUN MODEL
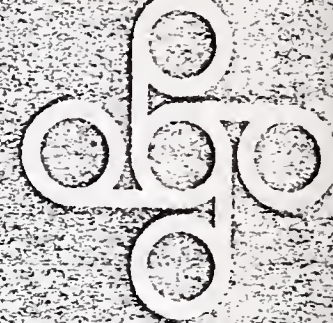
The Housing/Mortgage Long Run Model services consist of a long term model, historical data bases and forecasts of households, housing and mortgage data. The services are provided jointly by Professors Dwight Jaffee and Kenneth Rosen of Princeton University.

The services provide 12 years of historical data and 10 years of forecasts on a national basis as follows:

- Households by eight demographic groups
- Housing starts by type and mobile home shipments
- Sales of existing homes
- Mortgage loan originations and holdings
- Building site costs
- Vacancy rates
- Mortgage interest rates
- Household net worth
- Sales price of new and existing homes
- Deposit flows to thrift institutions

HISTORICAL DATA BASE

60 national series, demographic, housing and mortgage market data, annual, beginning in most cases in 1965.

FORECAST DATA BASE

- 53 series, annual, going out 10 years
- 41 endogenous variables
- 12 assumption variables
- All series updated quarterly

LONG RUN MODEL

User may set the values for eight key exogenous and policy variables as desired:

- 3-Month Treasury Bill Rate
- AAA Corporate Bond Rate
- Inflation Rate
- Construction Loan Interest Rate
- Effective Time Deposit Rates at Thrift Institutions
- Effective Time Deposit Rates at Commercial Banks
- Growth Rate Disposable Income per Capita
- Single Family Housing Units Subsidized

User can forecast 53 national series going out 10 years, including:

- Household Formations
- Housing Market Activity
- Mortgage Market Activity

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Waltham, Massachusetts 02154

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ONLINE REPORT SERVICES

A detailed description of the current base forecast and comparisions with optimistic and pessimistic bounding forecasts. The report also analyzes the assumptions used for the forecasts. The report is updated quarterly with the base forecast.

UNIQUE FEATURES AND USES OF MODEL

- Forecasts of household formations by age group and family status. A basic consideration for any long run consumer demand forecasting and investment planning decisions.

- Housing starts by structure type and mobile home shipments. Sales of existing single family homes. Critical input for long-range planning in the construction and housing related industries.

- Mortgage originations, holdings, and interest rates. Deposit flows to thrift institutions. Key to evaluating investment and portfolio decisions in financial and mortgage markets.

- Users may wish to input different assumptions into the model to obtain pessimistic, expected and optimistic forecasts for any variable. Graphs provide easily understood displays of such forecasts as shown below.
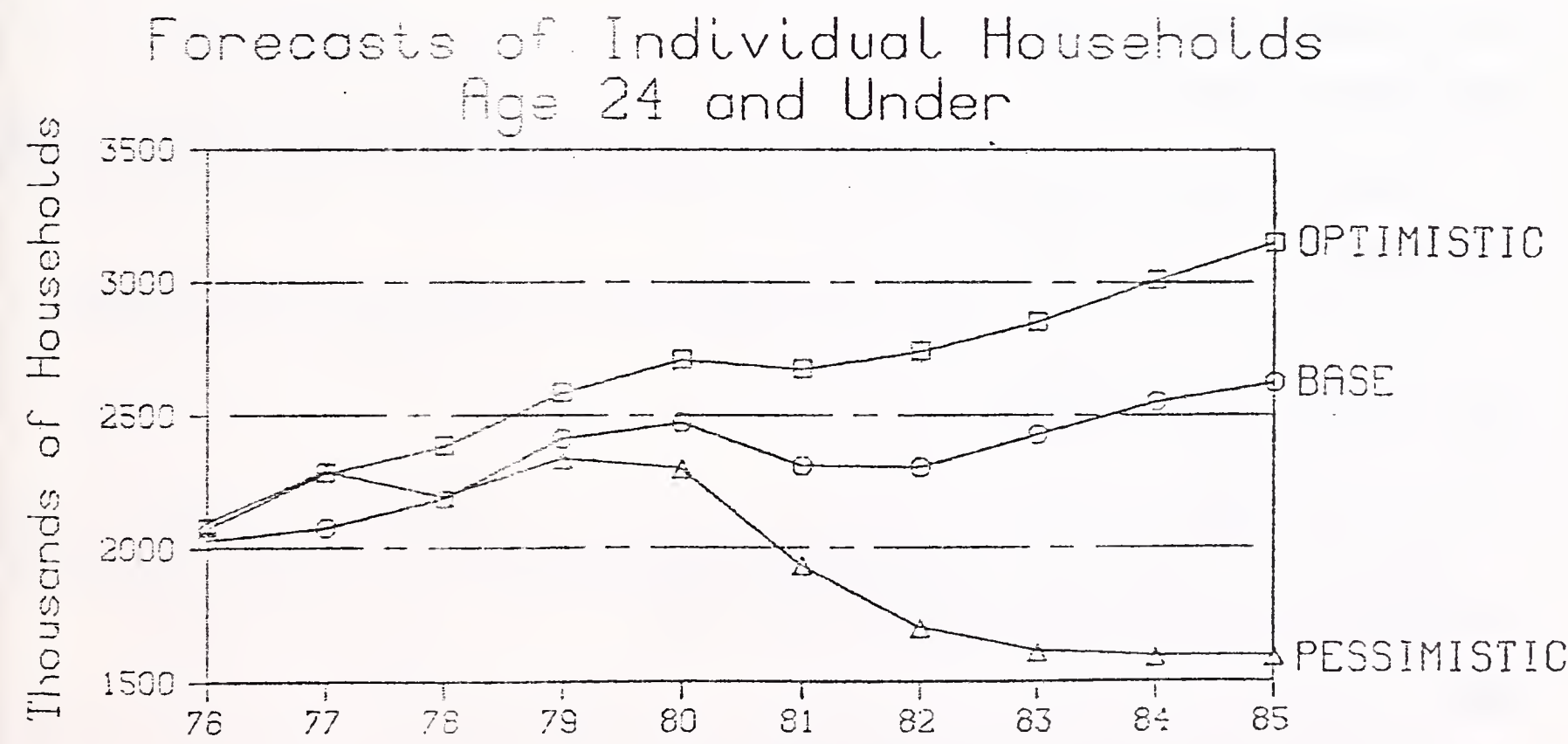
Forecasts of Individual Households
Age 24 and Under
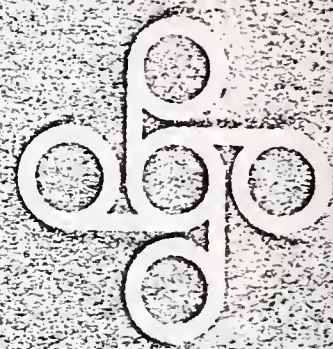
The NAHB Regional Housing and Mortgage Model services consist of historical data bases, a short-term model, and forecasts. These forecasting and time-sharing services are jointly provided by the National Association of Home Builders (NAHB) and Professor Kenneth Rosen of Princeton University.

These services provide detailed data by types of housing units and for starts, completions, units under construction, and mortgage and savings flows. Data is provided on a state, regional, and national basis. Some of the data and coefficients of the model are developed from surveys of NAHB members. Much of the data and forecasts are not available elsewhere.

HISTORICAL DATA BASES

Regional and National

175 quarterly series, beginning in 1965, covering the four national census regions (Northeast, North Central, West, and South).

State

102 series, two for each state and Washington, D.C. Starts for single family structures and multi-family structures. Quarterly data from 1971.

SHORT TERM FORECASTS

Regional and National Forecasts

112 forecasted series for the four census regions; four quarters into the future; updated monthly. Twice a year, input assumptions will be made so the model can be run 12 quarters into the future.

State Forecast

Single and multi-family housing starts projected four quarters into the future; updated monthly.

THE FORECASTING MODEL

Regional and National

Produces 112 forecasts. Users can set any of the following eight major exogenous variables: Treasury Bill Rate, AAA Corporate Bond Rate, Prime Rate, Real Disposable Income, Subsidized Housing Units, FNMA Purchases, FHLBB Advances, and Inflation Rate.

State

The eight major exogenous variables can be varied on the Regional and National Model to produce the user's own specific forecast of housing starts by state.

ONLINE REPORT SERVICES

Analysis of activity levels and trends are reported monthly.

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UNIQUE ADVANTAGES OF THE NAHB SERVICE

- The model is regional. Each of the five sectors and three markets are estimated and simulated on a regional basis.

Sectors:	Markets:
Supply of Savings	Savings
Mortgage Supply and Price	Mortgage
Builder Response	Housing
Household Demand	
Government Assistance	

- A regional data bank, previously unavailable, is available for the user's analysis.

- The model is disaggregated by three structure types; single, 2-4 family, and 5+ units.

- The national housing starts forecasts are derived by aggregation of the regional estimates.

- The model represents a major effort by the leading authorities in the homebuilding field. It combines the most appropriate forecasting techniques with explanatory variables never before used to produce a 127 equation non-linear simultaneous model.

THE NAHB SERVICES ARE USED FOR:

- Market Evaluation

  Market Strategy
  Product Line Forecasting
  Market Share Analysis
  Sales Quota Assignments

- Scheduling

  Production Scheduling
  Shipment Scheduling

- Planning

  Geographic Expansion
  Product Expansion
  Plan Location
  Budget Projections
  Investment Strategy

NAHB IS THE BEST SOURCE:

- Experienced in Housing

- Field Contact with Builders

- Advanced Statistical Techniques

  Regional Economical Models
  Most Variables
  Original Data Generation by NAHB

- More Detail in Types of Units

- Only Available State Data

- Accuracy Maintained with Frequent Updating

- Designed for Practical Businessmen

- Staff Available for Special Inquiries
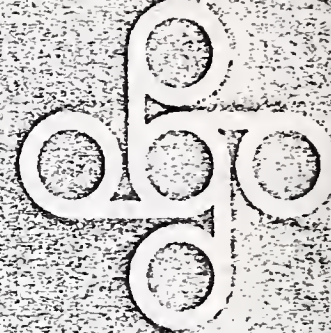
Chase Econometrics Associates, Inc. (CEA) is an economic forecasting and consulting firm offering four kinds of services on the *Interactive* system:

- Historical Data Bases
- Forecast Data Bases

- Forecasting Models
- Report Services

HISTORICAL DATA BASES

FINANCIAL HISTORICAL DATA BASES

Financial — Over 1500 series, including some 175 weekly series. All major tables in the Federal Reserve Bulletin.

- Money supply
- Interest rates
- Measures of reserves
- Assets and liabilities of commercial banks
- Construction activity

- Assets and liabilities of other financial intermediaries
- Securities indices and volume
- Consumer credit
- Mortgage debt and loans

Flow of Funds — Over 2000 series, beginning in 1952, showing the financial flows between different sectors of the economy.

PRICE HISTORICAL DATA BASES

Wholesale Price Indices — 2700 monthly commodity prices beginning in 1956:

- Farm products
- Processed foods
- Textile products and apparel
- Hides, skins, leather and related products
- Fuels and related products, and power
- Chemicals and allied products
- Rubber and plastic products
- Lumber and wood products

- Pulp, paper, and allied products
- Metals and metal products
- Machinery and equipment
- Furniture and household durables
- Non-metalic mineral products
- Transportation equipment
- Miscellaneous products

Consumer Price Indices — 1600 monthly series of U.S. and regional prices. 40 time series for each 25 cities; 500 series are national in scope.

- Food
- Housing
- Health and recreation

- Apparel and upkeep
- Transportation services
- Durable commodities

Interactive Data Corporation

UNITED STATES HISTORICAL DATA BASES

U.S. — Approximately 8500 economic time series. Major categories of data are:

- National Income Accounts — Quarterly and annual data, beginning in 1948
- Gross Product Originating and Factor Shares — Annual data from 1947 for each of 76 two-digit SIC codes
- Industry Profiles — For most of the 410 four-digit manufacturing industries
- Employment and Earnings — Monthly data for most two-digit and some three-digit industries
- Industrial Production — Monthly, seasonally adjusted data
- Wholesale Price Indices
- Manufacturers' Shipments, Inventories, New and Unfilled Orders
- Other macroeconomic variables

Business Conditions Digest — Measures 300 leading, coincident, and lagging indicators.

Energy — All major energy statistics for the 4 major types of energy: petroleum, natural gas, coal and electricity. State, total U.S. and international statistics are included. The kinds of data stored include petroleum demand and supply, world energy supplies, American Petroleum Institute data, Bureau of Mines control statistics, FRB industrial electric power use, Edison Electric electrical data and energy consumption by state.

REGIONAL HISTORICAL DATA BASES

Regional Industry — Over 10,000 annual series. Ten series in every state for each of 21 two-digit SIC codes. Data on employment, wages, payroll, man-hours, cost of materials, value added, value of shipments, capital expenditures, and inventories.

Regional Macro — Over 6600 series. The categories of data below are available for every state:

- Personal income by place of work and residence
- Employment and earnings
- Housing permits and starts
- Manufacturing
- Financial (loans and deposits)

- Electricity and natural gas data
- State government revenue, by tax category
- Population
- Cash receipts from crops and livestock
- Retail sales (14 states only)

For over 200 SMSA's data are available for:

- Employment and earnings
- Housing permits
- Department store sales

INDUSTRY HISTORICAL DATA BASES

Agricultural — Quarterly supply, demand, and price data for beef, pork, dairy products, poultry, eggs, wheat, corn, soybeans, sorghum, and cotton.

Conference Board — Proprietary Conference Board data on capital appropriations by industry.

Passenger Car — A data base of monthly and quarterly data covering industry, segment, corporate and carline product and sales detail. Also available are statistics on market shares, fuel economy, prices, used car sales, and inventories.

INTERNATIONAL HISTORICAL DATA BASES

International — Approximately 25,000 series for over 100 countries:

- Exchange rate statistics
- International liquidity statistics
- Monetary authorities statistics
- Commercial bank statistics
- Monetary survey statistics
- Other financial institutions statistics

- Financial survey statistics
- Interest rates, prices, and production
- International transactions statistics
- Government finance statistics
- National income accounts

FORECAST DATA BASES

All forecast data bases contain CEA's most recent estimates, based on their comprehensive models. In the case of the short-term macro forecasts, separate forecasts are maintained for four distinct scenarios — one standard and three alternatives; in other cases there is usually only one scenario.

Important note: All forecast data bases also contain historical values for every variable forecasted by the relevant model.

FINANCIAL FORECAST DATA BASES

Financial — Forecasts for about 230 monetary variables for each of the next 12 months. Updated monthly. Historical values back to 1961.

UNITED STATES FORECAST DATA BASES

Macro, Short Term — Quarterly forecasts of 500 macroeconomic variables 10 quarters into the future. Updated monthly. Historical quarterly values for all 500 variables going back to 1954.

Macro, Long Term — Same 500 macroeconomic variables as above. Annual forecasts going 10 years into the future. Updated monthly. Historical annual values going back to 1954.

REGIONAL FORECAST DATA BASES

Regional — Quarterly and annual forecasts for all variables contained in the CEAI regional grid forecast. Variables forecasted include personal income, retail sales, housing starts, employment, monetary statistics, value added by 2-digit SIC, shipments by 2-digit SIC.

INDUSTRY FORECAST DATA BASES

INPRO (Industry, short term) — Quarterly forecasts, 8 quarters into the future, of 110 industrial indices at the most detailed levels and 49 indices of various levels up to the Index of Total U.S. Industrial Production. Updated quarterly. Historical values beginning in 1954.

Fertilizer — 300 quarterly variables related to demand, production, stocks and wholesale and retail prices of major fertilizers. 8 quarter forecasts of the various commercial forms of nitrogen, phosphorus, potassium fertilizers are stored.

Non-Ferrous Metals — Historical data and forecasts relating to CEAI non-ferrous metal service. Metals covered are aluminum, copper, lead and zinc by end-use in the United States and also in Japan, United Kingdom, France, Germany and Italy. Data covers consumption, production, inventories and prices.

Insurance — Ten-year annual forecasts for 300 variables. Updated monthly. Historical values back to 1954.

Agriculture — Quarterly forecasts 8 quarters into the future for 200 variables. Updated twice a quarter. Historical values back to 1954.

Inflation Planner — Quarterly forecasts for over 200 prices, 8 quarters into the future. This data base is updated with new forecasts once a month.

INTERNATIONAL FORECAST DATA BASES

International — Quarterly forecasts for 300 variables in 12 countries, 8 quarters into the future; updated twice a quarter. Annual forecasts for the same variables going out 10 years; updated once a year. Historical values beginning in 1958.

Japan — Quarterly forecasts of over 300 variables for the next 8 quarters. Updated quarterly. Historical values back to 1954.

Foreign Exchange — Quarterly forecasts 8 quarters into the future of exchange rates for the Canadian dollar, British pound, French franc, Belgian franc, German deutschemark, Dutch gilder, Italian lira, and the Japanese yen. New forecasts are issued twice a quarter.

FORECASTING MODELS

The same CEA forecasting models which are used to generate the forecasts discussed above are also directly available to customers. Customers may use these models to generate their own forecasts, based on their own assumptions.

This can be done in two ways:

- By changing any input variable.
- By directly altering or predetermining the value of any variable which would otherwise be calculated directly by the model.

A change in one (or more) of these variables can have an effect on many other variables due to the simultaneity of the model.

The following CEA models are available:

- Macro, Short Term
- Macro, Long Term
- Financial
- International

- INPRO
- Agricultural
- Foreign Exchange

REPORT SERVICES

These are textual reports — economic commentaries and statistical releases.

INSTAT

A comprehensive news service with emphasis on the statistical releases of Government agencies, and including analysis by CEA economists.

Macroeconomic Reports

These include an executive summary of the Macro Model, a description of assumptions used to generate all solutions, and mid-month reports.

Financial Reports

These include an executive summary of the Financial Model and a weekly summary of the financial statistics published by the Fed.

International Reports

These include an executive summary of the International Model and special reports on fast-breaking economic developments abroad.
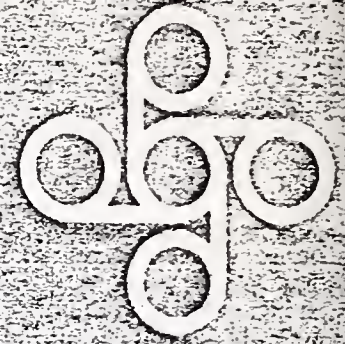
Agricultural Reports

These include the executive summary of the Agricultural Model.

Revision Reports

These tell the status of any proposed or actual changes or additions to any CEA data base or service.

Interactive Data's CORPORATE PLANNING SERVICES enable planners to make timely and effective decisions by providing the following tools:

DATA

Interactive provides access — through an international IBM computer time-sharing network — to the most comprehensive collection of financial and economic data bases available on any commercial system. These data bases, joined with your own private data, give you the ability to incorporate econometric models and forecasts in your corporate plans and help you compare a company's performance with economic and industry trends.

PROCESSING LANGUAGES

With Interactive processing languages, XSIM$^©$ and XDMS,$^{s-m}$ you make sense out of raw economic and financial data. XSIM is a complete system of information management, analysis, and display, especially designed for economic and financial modeling and planning. The XDMS data management language provides unique capabilities for handling large data bases.

PEOPLE

A network of experienced and dedicated people complements our time-sharing network, people ready and willing to give you the consulting and training support that can make the most out of your planning efforts.

APPLICATION AREAS

Financial

Cash Management

Budget and Control Systems

Long-Term Financing

Lease vs. Buy Analysis

Economic

Macroeconomic Analysis

- Domestic (national, regional)
- International

Industrial Sector Analysis

Product Line Forecasting

Monetary/Financial Sector Analysis

Input/Output Analysis

Corporate

Capital Budgeting

Merger, Acquisition, and Divestiture Studies

Profitability Analysis

Long-Term Planning Systems

Marketing

Sales Information

Market Share Analysis

Pricing

Prospective Market Analysis

Product Line Mix Analysis

Interactive Data Corporation
486 Totten Pond Road
Waltham, Massachusetts 02154

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ECONOMIC DATA SERVICES

Chase Econometric Associates, Inc.

- Historical Data Bases

  - U.S.
  - Business Conditions Digest
  - Financial
  - International
  - Consumer and Wholesale Price Index

  - Flow of Funds
  - Agricultural
  - Conference Board
  - Regional Macroeconomic and Industry
  - Energy and Passenger Car

- Forecast Data Bases

  - Short- and Long-Term Macroeconomic
  - Financial and Inflation
  - International and Foreign Exchange

  - Short-Term Industry
  - Agriculture and Fertilizer
  - Insurance

- Forecasting Models

  - User access to the models that generate Chase Econometrics' economic forecasts

- Report Services

  - Current commentaries on the statistical releases of the U.S. Government, as well as Chase Econometrics' outlook on the economy

Merrill Lynch Economics, Inc.

- Merrill Lynch Economics Data Bases

  - U.S. National Economic and Industry
  - U.S. Regional

  - Flow of Funds
  - Conference Board

- Economic Forecasts

  - Macroeconomic forecasts of the U.S. economy
  - Regional forecasts of income and employment indicators

- Econometrics Forecasting Models

  - U.S. Econometric Forecasting Model which enables the user to produce forecasts using alternative assumptions
  - Online industry forecasting models

- Online Bulletins

  - Summaries of Merrill Lynch Economics' current outlook for business and economic conditions

INDUSTRY DATA SERVICES

National Association of Home Builders

- Short-Term Regional Housing and Mortgage Model
- National, Regional, and State Historical Data Base and Forecasts
- Online Report Services

Dwight Jaffee and Kenneth Rosen

- Long-Run Housing and Mortgage Model
- Historical and Forecast Data Base
- Online Report Services

Ward's AutoInfoBank[s-m]

- Delivery, Production, Inventory and Shipment data for the automotive industry

FINANCIAL DATA SERVICES

Investor's Management Sciences, Inc., a subsidiary of Standard & Poor's Corporation

- COMPUSTAT® annual industrial data on 3500 companies
- COMPUSTAT quarterly industrial data on 2700 companies
- COMPUSTAT annual and quarterly utility data on 150 utilities
- COMPUSTAT annual and quarterly bank data on 115 banks

Arnold Bernhard & Company[1]

- VALUE LINE annual and quarterly data on 1400 industrial companies and utilities
- VALUE LINE line of business data on 1400 industrial companies and utilities
- VALUE LINE annual and quarterly data on 100 financial intermediaries

Federal Deposit Insurance Corporation (14,000 commercial banks)

- Quarterly reports of balance sheet data
- Semiannual report of income data
- Annual balance sheet and income items for the five most recent years

Extel Computing Limited

- EXSTAT annual data base on 2000 European and Australian industrial companies

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PROCESSING LANGUAGES

XSIM

XSIM is the complete and integrated language for economic and financial modeling and planning.

Data Management

Using XSIM, planners can create and manage private data bases as well as access the wealth of information in Interactive's economic and financial data bases.

General Data Analysis

XSIM is a comprehensive data analysis language, including facilities for:

- Screening and sorting
- Computing discounted cash flows, internal rates of return, and a wide variety of other financial measurements
- Performing a wide range of econometric and statistical analyses

Econometric Analysis

XSIM provides a complete set of techniques for formulating and estimating forecasting models:

- Regression analysis (multiple, stepwise)
- Specialized econometric procedures (autoregressive correction, distributed lag estimation)
- Box-Jenkins time series analysis
- Exponential smoothing
- Seasonal adjustment (using the X11 variant of Census Method II)
- Nonlinear and generalized least squares estimation

Modeling and Simulation

The simulation facility is useful in budgeting, pro forma analysis, financial planning, and econometric forecasting. XSIM models use simple, straightforward equations to represent all types of financial, economic, and marketing relationships. Special features include:

- Solution of simultaneous and nonlinear equations
- Automatic ordering of equations
- Cost savings over conventional programming languages

Reports

Unique capabilities for report generation in XSIM range from the quick and easy to the very detailed. XSIM reports are attractive, well formatted, and suitable for presentation to the highest levels of management.

Graphs

XSIM produces line graphs, bar graphs, pie charts, and scatter diagrams to suit your most explicit format requirements. Output devices supported by XSIM include typewriter terminals, CRT's, and four-color flatbed plotters.

Customized Applications

When used as a programming language, XSIM becomes a convenient tool for developing special purpose, interactive systems for customized applications.

XDMS

XDMS is a conversational data management language offering unique capabilities to users who require quick access to existing data files, maintain large data bases, or require online transaction-oriented applications for use by non-computer professionals. XDMS provides:

- Access to Interactive's financial data and ability to combine this data with user private data
- Compatibility with a wide range of existing data types and file formats
- Flexible and inexpensive report generation, including efficient production of multiple report formats and sorting on multiple fields
- Easy access to and manipulation of large data bases stored on tape or disk
- A comprehensive language for building and maintaining transaction-oriented applications

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| PEOPLE |
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Interactive provides extensive training and technical support through its local offices. Introductory and advanced workshops give users valuable guidance in using economic and financial data, XSIM, XDMS, and related Interactive services.

Interactive also provides professional consulting in corporate planning. Consultants, who hold advanced degrees in business, economics, and systems, assist in defining and developing economic and financial models and data base management systems.

Dynamics Associates, a division of Interactive Data Corporation, offers financial and econometric modeling on a contract basis. Large-scale management information systems are built either by Dynamics Associates or by Interactive's Professional Services Group. Your local Interactive marketing representative can help coordinate the variety of specialized Corporate Planning services available to you.

XSIM is a registered servicemark of Interactive Data Corporation. XDMS is a servicemark of Interactive Data Corporation. COMPUSTAT is a registered servicemark of Investor's Management Sciences, Inc., a subsidiary of Standard & Poor's Corporation. Ward's AutoInfoBank is a servicemark of Ward's Communication, Inc.

[1] The VALUE LINE Data Bases are owned by Arnold Bernhard & Co., Inc. and are marketed by Interactive Data Corporation.

The Three Facets of InfoCash: International

InfoCash: International consists of three separate computerized services that, when used together, form a complete, integrated financial management system. The services are: CHART, Regional Balance Reporter and CAPPS. You will find detailed information on each of them on the next few pages. As you will see, *InfoCash: International* is an extremely flexible system that you can tailor to your own particular needs. The choice of reports is up to you. They are all available from Chase through your computer terminal. *And, only Chase offers all three of these services in a single system.*

Introducing InfoCash: International
The Unique New Financial Management System

A brand-new service from Chase, *InfoCash: International* represents an innovative approach to financial management — offers you greater speed and accuracy in reporting your U.S. dollar balances and transferring funds. With *InfoCash: International,* you can bring your financial picture into sharp focus each day. It enables you to check your U.S. balances, make your dollar transfers and closely monitor all your account activity.

Chances are, you're confronted by these vital questions each morning:

What is my total U.S. dollar position — and where is it?

How may I more efficiently transfer funds?

How can I keep close track of all my money transfers and other account activity, particularly the movement of securities?

To make sound decisions — based on financial facts, not guesswork — you need quick, accurate answers to all these questions. That's the purpose of *InfoCash: International.*

Just touch a few keys on your computer terminal and read a report of your U.S. dollar balances. And not just for your Chase account. All balances at all your U.S. banks. Completely confidential, too.

You get a complete, detailed report on your Chase account each day. Where funds came from, how much and when available. And where they went. All identi-fied by Paying Bank/By Order of Party for credits, and Receiving Bank/Beneficiary for debits. Details of Security Transactions are also available. So you immediately know which transactions have been settled and which have not. And, *InfoCash: International* enables you to act quickly, to make your U.S. dollar transfers more directly and efficiently.

With this system at work for you, you can keep close control of your U.S. dollar position at all times, more easily reconcile your accounts, and put all your financial decisions into action.

Fastest, most efficient way to monitor your account activity...

CHART

(Chase Account Reporter via Terminal)

This *InfoCash: International* service provides the information you need to monitor the flow of funds through your Chase account and reconcile your U.S. dollar position on a daily basis with a minimum of time and effort.

All this information comes to you from Chase through your computer terminal. No need to wait for your bank statement and advices to come in the mail. And, you eliminate the need for costly international telephone calls and cables.

As you'll see from the following page fold-out, CHART provides you with a daily report of the balances and activity in your Chase account. And, through our special money transfer and securities reports, you can identify important details of funds transfers, or determine that your investment transactions have cleared and settled. CHART provides all this information before the opening of the New York business day, the time when it's most valuable to you.

For complete account control, call on CHART!

Easiest way to reconcile money transfer activity...

Money Transfer Reporter

Reconciliation of your account, particularly money transfer activity, is essential to effective financial management. Realizing this, we've developed a special money transfer report. And, it's available each morning, before the start of the New York business day.

This report provides detailed descriptive information showing the Paying Bank/Order of Party for credits, and Receiving Bank/Beneficiary for debits. It also provides valuable information concerning Value Dates and Funds Type (Clearing House or Available Federal Funds).

All the things you need to know to verify foreign exchange settlement contracts, reconcile C/D and Eurodollar trading settlements, and monitor the transfer of corporate funds.

MONEY TRANSFER DETAIL REPORT

S.00

MONEY TRANSFER DETAIL FOR CREDITS OVER

AMOUNT	VALUE DATE	FUNDS TYPE	PAYING BANK/ORDER OF PARTY
S6,000,000.00	02/02/77	CH	ORION BANK LTD. NEDERLANDSE CREDITBANK, N.V. AMSTERDAM, THE NETHERLANDS
S5,000,000.00		CH	BANQUE DE COMMERCE, S.A. CHASE MANHATTAN BANK VIENNA, AUSTRIA
S4,046,930.56		CH	BANCO ATLANTIDA, S.A. INTERNATIONAL BANK OF IRAN TEHERAN, IRAN
S3,013,593.75		CH	BANCO LAR BRASILEIRO, S.A. CHASE MERCHANT BANK NIGERIA, LTD. LAGOS, NIGERIA

S18,060,524.31   TOTAL MONEY TRANSFER CREDITS REQUESTED

Securities Reporter

Investment in the securities and corporate bond markets is an integral part of your daily business operation. But, the physical movement of securities can present a complex control problem. Many times, you don't know if securities were received or delivered. It's often difficult, if not impossible, to determine the status of your Securities Account. Now *InfoCash: International* brings you a complete report of all securities transactions.

Securities Reporter is a special feature of the CHART system. It provides you with specific details of all securities received by you or delivered to others. This includes number of shares, funds availability, clearing broker, etc. All the information you need to reconcile your portfolio of securities and closely monitor your investments.

SECURITIES TRANSACTION DETAIL REPORT

SECURITIES DETAIL FOR DEBITS OVER $1,000.00

AMOUNT	DESCRIPTION
$543,000.00	A/C: ESB777778 STL: 02/03/77 DLY (1) RECEIVED FROM BKR: NEW YORK WALL STREET BROKERS CSP: 123456789 RATE: 4.00 MTY: N/A $543,000.00 XYZ CORPORATION OF AMERICA. REF #: 86703
$437,502.08	A/C: AAA33333A STL: 02/03/77 DLY (1) RECEIVED FROM BKR: STOCK EXCHANGE COMPANY CSP: 345678912 RATE: 1.00 MTY: N/A $437,502.08 AIRLINE PREFERRED CUMULATIVE. REF #: 86704
$980,502.08	TOTAL DEBITS REQUESTED

Let Chase's Securities Reporter improve your investment decisions!

Fastest way to get your dollar balances...

Regional Balance Reporter

Wish to get all your U.S. dollar balances today, when the information can do you the most good? Then use this *InfoCash: International* service from Chase. Regional Balance Reporter provides balances for all accounts at each of your U.S. correspondents.

Acting as a central collection point for balance information from banks all across the United States, Regional Balance Reporter gives you a quick, comprehensive picture of your total dollar position. You get a hard-copy print-out right at your computer terminal so you can see at a glance how you stand — Ledger Balance, Available Balance, Total Debits, Total Credits.

Regional Balance Reporter is the fast, accurate, easy way to determine your U.S. dollar position. No need for time-consuming phone calls from individual banks. And, it frees you from the need to collect and consolidate a series of telex or cable messages before you know your dollar position. With RBR, you enjoy the benefit of computer speed...save time and labor...and you get complete information.

Isn't it time you consolidated all your U.S. dollar balances in one report?

CAPPS

(Chase's Automated Payments Processing Service)

A new Chase service for rapid, error-free initiation of international U.S. dollar transfers. Let's suppose that you receive your U.S. balance position from Regional Balance Reporter and CHART. Now you're ready to make decisions on what to do with the money.

With this new *InfoCash: International* service, any bank or corporation can initiate U.S. dollar funds transfers at Chase through their computer terminal. It is simple, automatic and timely. And, once entered, your payment instructions are processed electronically through an international computer network interfaced with CHIPS (Clearing House Inter-Bank Payment System). Not only that, but CAPPS will also accept certain SWIFT messages.

CAPPS is the speedy, efficient way to make inter-bank dollar payments. It is easy to use. No elaborate training is required.

Another important point. CAPPS virtually eliminates the need to code messages. No need to look up names and addresses. CAPPS has a computer file of the banks and corporations commonly involved in international transfers. Through its unique feature — NAME SEARCH — it provides computer assistance in identifying the correct name and address for contra-party banks and beneficiaries. This insures correct entry of instructions. And, that translates into error-free processing of transfers.

CAPPS insures the integrity of each message with extensive editorial checks. Also, it gives you a complete summary of all transactions at the end of the day for total audit control.

Act now to put your money into action with CAPPS!

How InfoCash: International Services Work Together To Give You Complete Account Control

To make the most of *InfoCash: International,* use all its services as an integrated system. Put them all together — CHART, Regional Balance Reporter and CAPPS — and you gain an added dimension in speed, accuracy and efficiency in day-to-day money movement and account control.

Let's take a closer look at how these services interact to your advantage. CHART will give you your dollar balances at Chase including advice-like details for money transfers and complete descriptive information on securities transactions. Regional Balance Reporter will provide you with balance summaries at all your banks throughout the United States.

Once you know your total U.S. dollar position, you have the information necessary to take action. Use CAPPS to help implement trading decisions by moving your funds rapidly and efficiently. The following morning, CHART gives you a clear picture of your trading activity and the cycle begins again.

With these InfoCash: International Services working for you, we think you'll reach a new level of financial management control.

Key to InfoCash: International —
Your Computer Terminal

All the services — and benefits — of *InfoCash: International* are readily available to you through the computer terminal in your office. You simply phone the *InfoCash: International* computer and give your private ID code and password. The computer responds by asking what type of report is desired. Within seconds of receiving your answer, the computer starts printing the desired report on your terminal.

Your ID and password codes assure strict security of your account information. Only you can activate the system, so only you will know the balances of your accounts. What's more, this electronic communication system is simple to operate. Anyone can do it without extensive training. Chase supplies complete user instructions. And the Chase staff is always available to give you any help you may need.

For more information or a demonstration of the InfoCash: International system, just contact your Chase Relationship Manager.

APPENDIX B: INTERACTIVE DATA CORPORATION
              PRODUCT PRICING
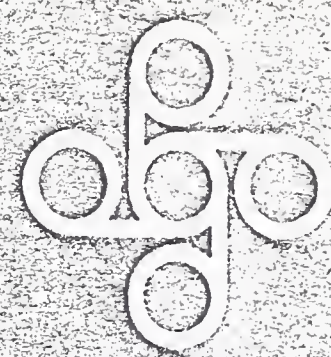
DATA BASE AND ECONOMETRIC SERVICE SUBSCRIPTIONS

(All charges stated are in addition to the charges set forth on the Data Processing Services Price Sheet of Interactive Data Corporation.)

Interactive Data Services, Inc.

Security Master Data Base	No Subscription Charge
PRICES Data Base	
FASTPRICE[1]	$0.05 per price
S&P Weekly Industry Indices History 1961-72	$500 Library Charge[2]
Daily Security Prices for 1968	$300 Library Charge[2]
ODA Fund Indices	$50 per month
Theoretical Options Data	$0.05 or $0.02 per item[3]
All Others	No Subscription Charge
Split & Dividend	No Subscription Charge
Monthly/Quarterly	$0.05 per item
MASTERPRICE[1]	$0.05 per price or yield
Municipal Bond Data Base	
Price or Yield	$0.15 or $0.05 per item[4]
S&P, Moody's or IDSI Rating	$0.02 per rating

Investors Management Sciences, Inc.

COMPUSTAT[5] Industrial Data Bases

Annual and Quarterly Files

1st File	$4500 per year
2nd File	4000 per year
3rd File	3500 per year
4th File	3000 per year
5th—8th File	2500 per year

These files are available on a trial basis for three months at 40% of the annual rate.

COMPUSTAT Utility Annual Data Base	$1500 per year

Arnold Bernhard & Co.

VALUE LINE Data Base

- $5000 per year, or
- $2000 per four months, or
- $0.07 per item

VALUE LINE Industry Relative Averages

- $300 per year, or
- $0.07 per item

Lynch, Jones & Ryan

I/B/E/S Summary Statistic Data Base

Subscribers to I/B/E/S Detail Data	
Current data	N/C
History data	$500 per year
Brokers Contributing to I/B/E/S	
Current data	N/C
History data	$500 per year
All Others	
Current and History data	$1500 per year

Federal Reserve System

FDIC Data Base

- $1000 per year, or
- $100 per month

Extel Computing Limited

EXSTAT Data Base

- $0.08 per item, or
- $700 per month, or
- $6500 per year

Interactive Data Corporation

Chase Econometric Associates, Inc. (CEA)

Regional Data Bases

Macro, State, and Metro	$1500 per year
Industry	$1500 per year
Both Regional Data Bases	$2500 per year

Energy Data Base

- $200 per month, or
- $2000 per year

International Data Base

International Subscription Service clients	$1500 per year
All other clients	$2000 per year

Agriculture Data Base

- $100 per month, or
- $1000 per year

Other Historical Data Bases and Forecast Files

$75 for the first two data bases or forecast files per month.
$25 per month for each additional data base or forecast file.
$200 per month maximum.

Models

Use of CEA models is subject to a 50% surcharge on CPU Charges.

Report Services

$150 per month or $1500 per year or $10 per Summary Report. $2 for other reports.

The stated charges for Historical Data Bases, Forecast Files and Report Services may not apply to certain CEA clients who purchase other services from CEA.

Merrill Lynch Economics, Inc.

Merrill Lynch Economics Data Bases

U.S. National Economic and Industry Data Base

- $100 per month, or
- $1000 per year

U.S. Regional Data Base

- $50 per month, or
- $500 per year

U.S. National Economic and Industry Data Base and U.S. Regional Data Base, Combined Plan

- $125 per month, or
- $1250 per year

The stated charges for Merrill Lynch Economics Data Bases may not apply to certain clients who purchase other services from Merrill Lynch Economics, Inc.

Econometric Forecasts and Model Services

There is a 165% surcharge for the use of XSIM[3] in conjunction with Merrill Lynch Economics Models, instead of the 65% XSIM surcharge.

National Association of Home Builders

Regional Housing and Mortgage Model

National, Regional and State Historical Data Base	$1500 per year
4 Quarter and 12 Quarter Forecasts, Regional Forecasting Model, Printed Forecasts, Online Report Services and Historical Data Base	$3000 per year

Dwight Jaffee and Kenneth Rosen

Housing/Mortgage Long-Run Model

Historical Data Base, Forecast Data Base, Long-Run Model and Online Report Services	$3000 per year

Ward's Communications, Inc.

Ward's AutoInfoBank[s-m]

- $150 per month, or
- $1500 per year

Customer may be required to contract directly with the data supplier. Such contract may specify the charges for and terms of the Customer's subscription to data bases or econometric services and supersede the prices set forth herein. Interactive Data Corporation's Agreement for Electronic Data Processing Services and Amendments thereto govern all charges for and terms of Interactive's service. Interactive's prices are subject to change as set forth in said agreement. In general, annual monthly or other periodic charges for data bases or other services are not refundable and may be payable in advance.

COMPUSTAT is a registered trademark of Investors Management Sciences, Inc., a subsidiary of Standard & Poor's Corporation. XSIM is a registered servicemark of Interactive Data Corporation. Ward's AutoInfoBank is a servicemark of Ward's Communications, Inc.

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[1] Five IDSI Data Subscription units are charged for a FASTPRICE price, a Monthly/Quarterly item, or a MASTERPRICE item. Each Data Subscription unit is charged at $0.01.

[2] The library charges for S&P Weekly Indices History and 1968 Prices are one-time charges.

[3] Projected Stock Volatilities, items SVVA-SVVD, are $0.05 items. Other items are charged at $0.02.

[4] Municipal prices or yields for the most recent seven calendar days are $0.15. All other municipal prices or yields are $0.05.
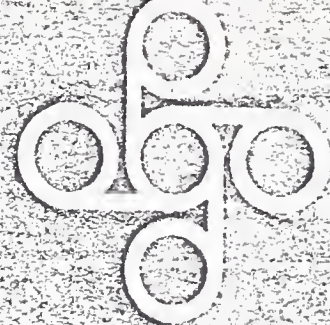
DATA PROCESSING SERVICES

	Interactive Service	ESBATCH Service Class 1 Background Execution	ESBATCH[4] Service Class 2 Overnight Execution
CONNECT CHARGES, per hour[1]			
Standard Virtual Machine (256K)	$10.00	N/C	N/C
For each additional 64K	1.00	N/C	N/C
30-cps Port Premium[2]	3.00	N/C	N/C
120-cps Port Premium	10.00	N/C	N/C
DISCONNECT CHARGES, per 64K, per hour[1]	1.00	S 1.00	N/C
CPU CHARGES, per unit[1,3]	.16	.16	S .08

Disk and Tape Charges

	Interactive Service	ESBATCH Service Class 1	ESBATCH Service Class 2
DISK (212,800 bytes per cylinder)			
Online Storage, per month, per cylinder			
First 5 cylinders	$35.00		
Next 25 cylinders	28.00		
All additional	17.50		
Temporary Online Storage, per hour			
100 cylinders	35.00	S35.00	S17.50
20 cylinders	10.00	10.00	10.00
10 cylinders	5.00	5.00	5.00
5 cylinders	2.50	2.50	2.50
Attachment of Private Disks, per hour	80.00	80.00	40.00
Minimum per attachment	10.00	10.00	
Offline Storage of Private Disk Pack, per month or part			
Interactive's Disk Pack	50.00		
Customer's Disk Pack	20.00		
MAGNETIC TAPE			
Use of attached Tape Drive, per hour	10.00	10.00	N/C
Minimum per tape mount	5.00	5.00	
Storage of Magnetic Tapes in excess of two per USERID, per tape, per month or part	5.00		
Tape Transmission, per drive, per hour	15.00		

Communications costs will be rebilled to customers.

[1] Connect Charges, Disconnect Charges, CPU Charges and associated software surcharges incurred for Time Sharing Services provided or initiated outside the United States are based on the price schedule pertaining to the location where the services are provided or initiated, and converted to dollars for invoicing.

[2] This charge does not apply to Boston area ports.

[3] CPU Charges reflect utilization of all resources of the computer and are measured under operating system control. Interactive's method of measuring such charges may be modified or changed from time to time without notice. The computation of CPU Charges for Virtual Machines larger than 1024K includes an additional surcharge of 3% for each 64K above 1024K.

[4] Charges for Interactive's JOB EXEC Service are the same as the charges for ESBATCH Service Class 2 except that there is a Handling Charge of S10.00 per run.

Input/Output Services

PRINTERS/READERS/PUNCHES[5]

High-Speed Printers in Waltham	
Normal use as virtual printer	N/C
Special attachment to user, per hour	$60.00
Minimum per attachment	10.00
Special offline magnetic tape to printer, per hour	25.00
Medium-Speed Remote Printers, per page[6]	
At Boston and New York Offices	N/C
At other offices in the U.S.	.25
At London and Frankfurt offices	.50
Card Reader/Punches per box of 2,000 cards	
Card reader/punch in Waltham	N/C
At Boston and New York offices	N/C
At other U.S. offices	10.00
At London and Frankfurt offices	20.00
XEROX 1200 Computer Printing System	
Per copy per page	.025

Special Printer Materials

2-Part Paper	
At Waltham and Cortlandt Street, New York, per inch of stacked paper, or fraction thereof	$ 5.00
At other offices where available, per page	.30
4-Part Paper	
In Waltham and Cortlandt Street, New York, per inch of stacked paper, or fraction thereof	5.00
At other offices where available, per page	.30
Carbon Ribbon	
In Waltham and Cortlandt Street, New York	
Per inch of stacked paper	25.00
Setup Charge	5.00
TN Print Train in Waltham, per inch of stacked paper, or fraction thereof	5.00

Graphics

Plotter in Waltham	
Per hour of use	$30.00
Standard setup	N/C
Special setup	10.00
DISSPLA Software Surcharge, per 100 vectors generated	.125

Software Usage Surcharges

	Connect	Disconnect	CPU
FFL	50%	50%	50%
HASSEM			50%
XSIM®	65%	65%	65%
XSCAN[s-m]	65%	65%	65%

ANALYSTICS③ Data Accessing Charges[7]

ANALYSTICS Units, per month, per unit.	
Interactive Service and ESBATCH Service Class 1	
First 25,000	$ .02
Next 25,000	.01
Next 50,000	.005
All additional	N/C
ESBATCH Service Class 2	
First 20,000	.005
Next 400,000	.001
All additional	N/C

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[5]The cost of special paper, forms, cards, and mailing, delivery, and shipping will be rebilled to customers. Arrangements can be made for connection of the customer's medium-speed remote printers and card reader/punches.

[6]A volume discount is available and will be quoted upon request.

[7]There is no ANALYSTICS Data Accessing Charge for the security names FFLD, DES1, DES2, S008, D016, and IDCD, for the FDIC names BNAM, CNAM, and STAB, for the items QEDB and BNXI, for certain COMPUSTAT and VALUE LINE data accessed via XSCAN, for Chase Econometric Associates, Inc. data, and for the Merrill Lynch Economics, Inc. data. Five ANALYSTICS units are charged for each access of a Split and Dividend record.

This price list is to provide convenient information only. Interactive Data Corporation's Agreement for Electronic Data Processing Services and the Amendments thereto govern all charges for and terms of Interactive's service. Prices are subject to change as set forth in said Agreement.

ANALYSTICS and XSIM are registered servicemarks of Interactive Data Corporation. XSCAN is a servicemark of Interactive Data Corporation. DISSPLA is a proprietary software product of Integrated Software Systems Corporation, San Diego, Ca.
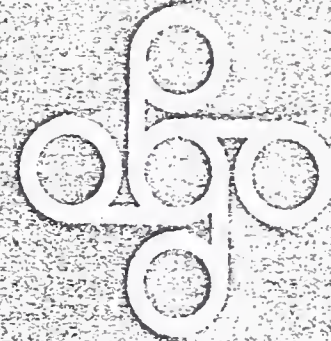
XPORT®

COMPUTER SERVICES

		XPORT UNITS
CONNECT CHARGES, per hour		
Standard Virtual Machine (256K)[1]	$10.00	
30-cps Port Premium[1,2]	$ 3.00	
120-cps Port Premium	$10.00	
XPORT UNITS, per unit	$ .01	
Online data storage	N/C	
Offline data backup and storage	N/C	
CALXPORT } see Data Processing Services price list CPU Charges		
XSIM/XPORT }		

	XPORT UNITS
Executive Level Commands	
All Executive Commands, per use	N/C
Account Level Commands	
ADD, per use	10
REV, per transaction reversed	50
ROLL BACK, per use	1000 plus
per transaction	5 plus
per XPM record created	100
SELL and CHG, per lot	50
All other Account Commands, per use	50
Maintenance Level Commands	
PORT, per use	50 plus
DISPLAY function, per portfolio over one	25
CHGID function, per portfolio	500 plus
per XPM record changed	5
FLAG or UNFLAG, per use	50 plus
per security (un)flagged	2
All other Maintenance Commands, per use	50
Performance Level Commands (XPM)[1]	
CALCULATE or RECALC	
per portfolio or aggregate	
per time period	500 plus
per index over three, per time period	50 plus
per transaction scanned	1
Premium for Aggregate	
CALCULATE or RECALC	
per time period	500
DISP or DISU	
per record displayed, first copy	100
additional copies, per copy	25
PGRAPH	
(Aggregated or individual)	Price for each format is available upon request

	XPORT UNITS
Performance Level Commands (XPM)[1] (Cont'd)	
PREPORT[3]	
(Aggregated or individual)	
per report, first copy	500 plus
per time period utilized over twelve	20 plus
per total line over two	50
additional copies, per copy	100 plus
per time period utilized over twelve	5
Report Level Commands[4,5,6,7,8]	
MINI Reports, per request	45 plus
per item	3
Dividend Audit Report, and	
Bond Interest Estimate Report, per portfolio	500 plus
per line	5 plus
per transaction scanned	1
MUTE Appraisal, per portfolio	200 plus
per item	5
Net Asset Value Summary Appraisal,	
per portfolio	250 plus
per item	5
Premium for AGGREGATE Appraisal Report	
per security, per portfolio	1.5
Premium for AR/BACK or UP/BACK	
family, per transaction	5
Premium for AGGREGATE Transaction	
Journal, per report	500
Premium for Broker Commission Report and	
Summary Cash Ledger, per 5 transactions scanned	1
All other Reports[9]	
Output to Terminal, per copy	700 plus
per line	7
Output to Line Printer, first copy	500 plus
per line	5
Additional copies	100 plus
per line	2
Support Level Commands	
FRAC/LIST, per report	500 plus
per line	5
FRAC, per portfolio	50 plus
per transaction generated	Account Level charging
POST, per portfolio	50

MINIMUM CHARGE: A minimum charge of $100.00 per month, per XPORT USERID applies effective as of the beginning of the third calendar month after the USERID is established.

Interactive Data Corporation

486 Totten Pond Road
Waltham, Massachusetts 02154

S2–Rev. J
Effective February 1, 1977

CLERICAL SERVICES

If the Customer does not wish to post his portfolios and generate reports using a time-sharing terminal, Interactive will perform these activities. Charges will be quoted based on the volume of clerical and computer services provided. Bursting, decollating, and stapling services are charged at S .50 per original report and S .10 per additional copy. Keypunching is charged at S .10 per card. For file recovery from magnetic tape, there is a surcharge which depends upon the clerical and computer resources utilized. Interactive provides a CUSIP Lookup service for a charge of S .25/CUSIP. XPORT Customer Service will then load the CUSIP number into the user's Central Asset File at current XPORT rates.

PRODUCTION SERVICES

If the Customer has many portfolios or transactions, Interactive will post portfolios and generate reports for the Customer at night on a regular schedule. Lower charges for certain computer services are available, based on the Customer's agreement to a minimum service volume and a minimum service term.

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XPORT is a registered servicemark of Interactive Data Corporation. MASTERPRICE is a servicemark of Interactive Data Services, Inc. XSIM is jointly-owned servicemark of Dynamics Associates and Interactive Data Corporation.

This price list is to provide convenient information only. Interactive Data Corporation's Agreement for the Use of XPORT and/or Agreement for Electronic Data Processing Services and the Amendments thereto govern all charges for and terms of Interactive's service. Prices are subject to change as set forth in said Agreement(s). See XPORT documentation for prices of XPORT Services first made available after the date of this price list.

[1] The connect charge, per hour, for virtual machine sizes larger than 256K is S10.00 plus S1.00 for each 64K increment in excess of 256K. XPORT now requires virtual machine sizes larger than 256K. The exact size required depends upon the user's activity and volume. The Performance Level (XPM) requires a minimum of 576K.

[2] This charge does not apply to Boston area telephone numbers.

[3] In the case of a triangular PREPORT 'per report' means 'per portfolio or index.'

[4] The cost of special paper, forms, cards, and delivery and shipping will be rebilled to customers. Detailed charges for the use of regular 2- or 4-part paper and carbon ribbons are listed on the Data Processing Services Price List. Arrangements can be made for connection of customer dial-up medium-speed remote printers and card reader/punches.

[5] For printing of reports originally generated on magnetic tape, there is a S .50 surcharge per original copy of each portfolio for Appraisal Reports and a S5.00 surcharge per original copy for Security Inventory Reports.

[6] XPORT uses several sources to price securities, and the charge for pricing varies with the source. Generally, prices are provided at no charge with the following exceptions:

FASTPRICE, per price	S .05
MASTERPRICE, per price	S .25
Municipal bonds, per price (scheduled)	S .25
Municipal bonds, per price (on request)	S .50

[7] Because MASTERPRICE prices are directly available online, there will be an additional S .25 fee for each security included in MASTERPRICE which is priced manually.

[8] There is a charge of S .05 per item accessed for Monthly/Quarterly subscription data. Value Line accesses will be charged at a rate consistent with the type of contract signed by the client.

[9] In the case of a Consolidated Transaction Journal "per line" means "per transaction utilized."

APPENDIX C: LEADING ECONOMETRIC CONSULTING
              SERVICES VENDORS

LEADING ECONOMETRIC CONSULTING SERVICES VENDORS

- Chase Econometrics, Inc.

- Data Resources, Inc.

- Merrill Lynch Economics

INPUT

1.   CHASE ECONOMETRICS ASSOCIATES, INC.

o   Description

Chase Econometrics Associates, Inc. (CEA) is an economic fore-
casting and consulting firm. It offers both subscription
(consulting and report) services and on-line access to data
bases and econometric models through a Chase subsidiary Interactive
Data Corporation and also through ADP Network Services Inc.

o   Services Offered:

-    Economic Data Bases:

   •   United States Data Base

The Chase Econometrics U.S. Data Base contains approximately 7,500
economic time series on a monthly, quarterly, and annual basis.
This data base includes all the standard macroeconomic variables
included in the National Income Accounts.

The U. S. Data Base also includes a complete set of industry data.

   •   International Data Base

The data base contains approximately 25,000 series for over 100
countries on a monthly, quarterly, and annual basis.

The Chase Econometrics International Data Base also contains
monthly exchange rates and monthly interest rates for the OECD
countries.

   •   Financial Data Base

The data base includes over 1,500 series, representing all the
major tables in the Federal Reserve Bulletin.

   •   Agricultural Data Base

Chase Econometrics also offers several hundred statistical series
for the agricultural sector. The data base includes all of the
variables which are used in the Agricultural Model on a quarterly
or annual basis, plus monthly series for key price and quantity
variables.

-    Forecasting Models:

- Macroeconomic Model

The Macroeconomic Model is a simultaneous model used for fore-
casting the U.S. economy. It contains over 200 variables and
over 100 exogenous variables. Users solve the model for any
number of quarters up to ten, and may print out any variety of
forecasting variables or tables which are desired.

- Monthly Interest Rate Model

The Monthly Interest Rate Model forecasts over 50 variables in the
monetary sector, including all major interest rates, components of
the money supply, and reserve aggregates. The model is designed
to simulate the monetary sector. Forecasts are available for the
next 13 months on a monthly basis.

- Short-term Industry Model

The Short-term industry model predicts 120 components of the in-
dustrial production index on a quarterly basis for the next eight
quarters. This model is recursively structured.

- Agricultural Model

The Agricultural Model generates predictions of price and quantity
for the ten major commodities in the agricultural sector. The
model predicts these variables on a quarterly basis two years into
the future. Forecasts are also provided for gross and net farm
income.

- Special Industry Models

Models on Machine Tools--Coal--Consumer Electronics--Insurance--
Auto Pollution are available.

- Forecast Data Bases:

- Macro, Short Term

Quarterly forecasts of 500 macroeconomic variables 10 quarters into
the future. Updated monthly. Historical quarterly values for all
500 variables going back to 1954.

- Macro, Long Term

Same 500 macroeconomic variables as above. Annual forecasts going
10 years into the future. Updated monthly. Historical annual
values going back to 1954.

INPUT

o   Financial

Forecasts for about 230 monetary variables for each of the next
12 months. Updated monthly. Historical values back to 1961.

o   International

Quarterly forecasts for 300 variables in 12 countries, 8 quarters
into the future; updated twice a quarter. Annual forecasts for the
same variables going out 10 years; updated once a year. Historical
values beginning in 1958.

o   Japan

Quarterly forecasts of over 300 varibles for the next 8 quarters.
Updated quarterly. Historical values back to 1954.

o   INPRO (Industry, short term)

Annual forecasts, 8 quarters into the future, of 110 industrial
indices at the most detailed levels and 49 indices of various
levels up to the Index of Total U.S. Industrial Production.
Updated quarterly. Historical values beginning in 1954.

o   INFORUM (Industry, long term)

Annual forecasts, 10 years into the future, for about 1,000 industry
variables, covering 185 industries. Updated three times a year.
Historical values back to 1955.

o   Agriculture

Quarterly forecasts 8 quarters into the future for 200 variables.
Updated twice a quarter. Historical values back to 1954.

o   Insurance

Ten-year annual forecasts for 300 variables. Updated monthly.
Historical values back to 1954.

-   Report Services:

The textual reports contain economic commentaries and statistical
releases.

o   INSTAT

A comprehensive news service with emphasis on the statistical
releases of Government agencies, and including analysis by CEA
economists.

● Macroeconomic Reports

The reports include an executive summary of the Macro Model, a
description of assumptions used to generate all solutions, and
mid-month reports.

● Financial Reports

The reports include an executive summary of the Financial Model
and a weekly summary of the financial statistics published by
the Federal Reserve.

● International Reports

The reports include an executive summary of the International
Model and special reports on fast-breaking economic developments
abroad.

● Revision Reports

The reports tell the status of any proposed or actual changes or
additions to any CEA data base or service.

- Estimated Clients:

  700 (of which 320 are on-line)

- Estimated 1976 Revenues: $8.5M

INPUT

2. DATA RESOURCES INCORPORATED

● Description

Offers econometric consulting services by combining on-line access
to world-wide economic forecasts, data banks, models and software
with management and technical consulting, educational programs
and contract research to meet the particular needs of each
customer. DRI provides full language capabilities for Remote
Computing on their own Burroughs B7700.

● Services Offered:

– Corporate Planning

   ● Forecasts product line demands
   ● Develops budget and control models
   ● Links corporate cash flows
   ● Models the effects of investments

– Regional Analysis

   ● Models relationship of employment, housing, income, retail
     stores, etc.
   ● Forecasts changes in regional conditions

– Investment Analysis and Decisions

   ● Inter-industry check on estimate consistency
   ● Forecasts relative industry profitability
   ● Identifies new industry profit opportunities
   ● Models individual company sales and profits

– Support for Economic Research Centers

   ● On-line data
   ● Model building and simulation
   ● Training of researchers and students

– Insurance

   ● Forecasts growth, costs and profitability
   ● Demand potential for commercial insurance
   ● Demand potential for private lines by state
   ● Forecasts policy loan demand
   ● Models real estate and direct investments
   ● Evaluates industry-by-industry profit outlook

IN

- Banking

  - Industry-by-industry cash flows
  - Forecasts loans, deposits, other cash flows
  - Evaluates industry-by-industry profit outlook
  - Supports bank economics analyses
  - Models real estate and direct investments

- Marketing

  - Checks internal sales forecasts
  - Monitors sales performance
  - Projects long-term prospects for product lines
  - Analyzes special effects of promotional and advertising campaigns

- Financial Modeling Languages

  The Data Resources MODSIM program is a model simulator and report writer that both solves financial models and presents the results in camera-ready form. Typical uses include cash-flow analysis, asset/liability management and sales forecasting.

  Models may be recursive, simultaneous or block recursive and can contain over 700 equations. Reports are user-designed and can perform selection and ranking routines.

- DRI Data Banks

  - U.S. National and Regional

  The U.S. national and regional economic data banks consisting of over 40,000 data series (data series are records of economic statistics over time, such as "monthly U.S. factory sales of passenger cars, 1947-present") on national income accounts, production, orders, shipments, inventory, employment, the price indexes and their principal components, interest rates, monetary aggregates, incomes (including wages and profits), housing starts and automobile sales.

  - European

  Individual European country data banks providing approximately 1,500 series on macro-economic, industry and financial statistics from national government and private sources in Western Europe.

INPUT

- Energy

- An energy data bank providing over 6,000 series on the supply, demand, stocks and prices of various energy sources.

- Steel

- A steel data bank providing over 2,500 series on shipments, imports, exports, inventories, prices and costs of steel and related items.

- Financial Data Banks

- Compustat Financial data on 2,500 U.S. corporations

- ValueLine Financial data on 1,500 U.S. corporations

- Flow of Funds

- A flow of funds data bank of over 3,700 series on sources and uses of funds in the U.S. economy provided by the Federal Reserve Board.

- International Financial Statistics

- A data bank of international statistics gathered by the International Monetary Fund providing over 30,000 series covering gross national products and production and exchange rate data on 110 foreign economies.

- Japan

- Banks of data collected by Nihon Keizai Shimbun (a major financial publisher) providing over 2,000 series on Japan's economy, and financial and operating performance statistics for over 1,300 Japanese companies.

- Canada

- A data bank of Canadian macroeconomic data distributed by Statistics Canada providing over 8,000 series on the Canadian economy.

- OECD

- Data banks compiled by the Organization for Economic Cooperation and Development containing over 35,000 series on economic activity in the major industrialized countries of the world, including national income accounts, main economic indicators, industrial production statistics and bilateral trade between countries in the aggregate and by commodity category.

-    DRI Forecasting Models

   •   Macro Model of U.S. Economy

   - The central model in the DRI system is DRI's "macromodel" of
     the U.S. economy. It forecasts over 900 variables through
     its system of equations. Forecasts are provided each month
     for the succeeding 8 to 12 quarters and are provided each
     quarter for the succeeding 10 years.

   - By using this model, changes in national variables, such as
     monetary policies, budget policies, population growth,
     consumer attitudes, costs of capital, raw material prices and
     international economic trends can be analyzed in terms of
     their impact upon the major dimensions of the economy as a
     whole, and on specific industries.

   •   Other Models

   - DRI has developed models of foreign economy used for market
     analysis and as inputs for industry analysis. Energy models
     for projecting key energy demands and prices, state models
     for budgeting, revenue estimation for the analysis of
     programs, and regional models for regional locations choices.

   - DRI has developed indices by models for U.S. agriculture,
     petro-chemical, wood products, steel, casualty insurance
     and banking.

   - DRI has developed models for inflation monitoring for foreign
     exchange rate forecasting, and on a demographic age-income
     model.

-    DRI Report Services

     DRI also provides a regular flow of textual memos analyzing
     current economic developments. They are also available either
     through computer time-sharing or are summarized in the Data
     Resources Review, a publication distributed monthly to sub-
     scribers to this service.

-    Estimated Clients: 400

-    Estimated 1976 Revenues: $16M

3.   MERRILL LYNCH ECONOMICS

●   Description

Merrill Lynch (ML) Economics offers econometric consulting
services through an experienced professional staff backed by
econometric analysis, a model of the U.S. economy, and access
through a remote computer system for economic forecasting and
consulting.

ML econometric services provides the tools, resources, and con-
sulting necessary to construct econometric forecasting models
and computer-based corporate planning systems, and immediate
access to detailed short-term economic forecasts as input for
these systems through a nationwide remote computing network.

●   Services Offered:

-   FORECASTS OF ECONOMIC INDICATORS: Quarterly forecasts for
    over 200 economic indicators updated monthly and available
    through remote computing.

-   ANALYSES OF ECONOMIC AND INDUSTRY TRENDS: In-depth economic
    reports, online bulletins, and direct communication with
    industry specialists for background analyses.

-   ECONOMIC DATA BASE: Historical data for over 8,000 time
    series measuring activity in all sectors of the U.S. economy.

-   XSIM SYSTEM FOR INFORMATION MANAGEMENT AND ANALYSIS: A
    powerful, yet easily learned and used, conversational language
    for econometric analysis, report generation, systems
    development, and model building.

-   ECONOMETRIC CONSULTING AND EDUCATION: Quarterly seminars,
    workshops, and personal consultation in applied econometrics,
    modelbuilding, systems design, and industrial forecasting.

-   NATIONWIDE REMOTE COMPUTING NETWORK: An established, highly
    reliable computer network, offering extensive economic,
    corporate, and financial data bases, with client technical
    support and education in regional offices throughout the
    country.

-   ML economic forecasting system. The system is a balance of
    econometric techniques, judgment, and forecasting experience.
    The approach to short-term economic forecasting employs a
    detailed model of the U.S. economy, balanced by the judgment
    and experience of a large staff of economic specialists

in the areas of industrial, financial, national, and international economics.

The economic forecasting model has been specifically structured to facilitate maximum staff interaction and control to insure that forecasts will reflect qualitative judgment and anticipation of structural change. The model operates as the core of the economic forecasting system, to produce up-to-date and fully consistent forecasts in the extensive detail required for effective corporate planning.

- <u>ML industrial economic forecasting</u>. The system provides detailed forecasts and analyses for major U.S. industries. The forecasting system takes advantage of both quantitative methods and qualitative judgment in forecasting major industrial sectors. Disaggregated satellite models produce base forecasts which are modified for judgmental factors and used as input for the macroeconomic model.

    Forecasts from these satellite models, updated monthly, are consistent with our assumptions for the total economy and provide a valuable check on consistency between sectors. Output from the industry models is also the basis for an extensive set of detailed industrial reports relating our outlook for the total economy to specific industries of interest.

- <u>ML economic outlook bulletins</u>. On-line availability gives instant access to analyses of changing economic conditions.

    The econometric services system, allows the user to access through RCS services ML's analysis of changing economic conditions.

- <u>On-line access to economic forecasts</u>. This is provided by direct remote computing access to short-term forecasts of quarterly economic indicators. Forecasts of over 200 quarterly economic indicators are updated and stored in a data base. The data base can be accessed directly by client forecasting models. These forecasts, in conjunction with on-line bulletins, provide detailed and up-to-the-minute information on ML's current outlook.

- ML econometric consulting and education. The services provide all necessary training and support for client research.

    - Quarterly Seminar Presentations
    - Econometric Consulting and Support
    - Special Project Consulting
    - Training in Use of XSIM

- Estimated 1976 Revenues: $6.5M

APPENDIX D: LEADING FINANCIAL AND ECONOMIC
              REMOTE COMPUTING SERVICES VENDORS

LEADING FINANCIAL AND ECONOMIC REMOTE COMPUTING SERVICES VENDORS

- ADP Network Services (ADP)

- Boeing Computer Services (BCS)

- Compu-Serv

- Data Resources Inc. (DRI)

- General Electric - Information Services Division (GEIS)

- Interactive Data Corporation (IDC)

- National CSS, Inc. (NCSS)

- Rapidata

- Remote Computing Corporation (RCC)

- Service Bureau Company (SBC)

INPUT

1.   ADP NETWORK SERVICES, INC.
       (Cyphernetics Division)

●   Description

       The Cyphernetics Division of ADP Network Services offers an
       extensive package of financial and economic planning packages,
       economic and financial data bases, financial modeling and analysis
       software, econometric services through Chase Econometrics,
       a sophisticated international communications network, and a full
       range of economic remote computing services.

●   Services Offered:

       -     Bank Management Services

       Serving leading U.S. and international banks with a wide range of
       management services, the Cyphernetics Division offers; (1) a
       complete bank data base system called BANCALL; (2) a lessor-
       oriented analytical system called Lease 100; (3) financial
       reporting system called Cypherplan; (4) credit analysis and bank
       planning called Cyphertab; and, (5) a system for portfolio
       management called Cypherstat.

       -     Industrial Services

       Utilizing a proprietary language called IFL, Cyphernetics offers
       production and inventory control, order entry, financial consoli-
       dation systems and a variety of other industrial applications.
       Large-scale teleprocessing applications are a specialty.

       -     Economic Services

       In conjunction with Chase Econometric Associates, Cyphernetics
       provides economic modeling of the U.S. economy and many of its
       subsectors, international models and a complete array of economic
       data bases. Extensive analysis is possible with TSAM, a language
       for the analysis and management of time series data.

       -     Financial Services

       An extensive family of corporate financial and securities data
       bases are available for the investment community and corporate
       finance. Analysis of debt and common stock offerings, mergers and
       acquisitions, portfolio performance and selection, as well as
       dividend studies are among the common applications.

-   Remote Computing Services

Augmented High Level Languages and diagnostic packages combine with
an error checking and correcting network to provide a high level of
service for traditional "custom-programmed" remote computing
applications.

- Data Bases:

-   BANCALL

Twice yearly financial data on over 14,000 U. S. Banks, 200
separate data items per bank.

-   Compustat

Over 120 annual items on 4000 U. S. companies over 20 years,
36 quarterly items over 10 years, covering income statements,
balance sheets and stock market data.

-   MSF

Descriptive data on over 50,000 securities, stocks, bonds, options
and government securities, updated daily.

-   HSF

4000 historical time series on all NYSE,   , and OTC stocks,
including daily high, low, closing prices and volumes.

-   Chase

The full set of Chase Econometric data bases are available on
subscription through Cyphernetics.

- BANCALL:

BANCALL is a financial applications system which utilizes the
BANCALL data base. The system operates on three levels.

-   Level I

    Applications software to produce over 100 reports by user
    selection for analysis and performance, market share and
    asset/liability management studies.

-   Level II

    A data base access and report generator which allows the user
    to analyze and summarize and report time series in the data
    base.

INPUT

- Level III

    Interconnects the capabilities of Level I and II with financial
    and econometric modeling languages (TSAM) or (Chase Econometrics)
    to allow sophisticated financial and econometric analysis of the
    banking industry.

- Data Bases Supported:

    Chase, NBER, Compustat, BANCALL, MSF, HSF

INPU

2. BOEING COMPUTER SERVICES, INC.

● Description

Wholly owned subsidiary of Boeing Aircraft Co. Supplies interactive computing services both in-house to Boeing, to the aerospace and defense industries, to governments and more recently to financial and industrial institutions through a joint venture with Wharton Economic Research Associates.

● Services Offered:

A wide range of data processing, data management, data control, interactive and remote batch services are offered. Consulting is available for prospective customers.

● Financial Modeling Languages:

The Wharton FEA Short and Long Term Forecast Models are available together with or separate from the WFEA data bases and data base access and analysis software.

● — Data Bases Supported:

WFEA Economic Data Bases, WFEA Regional Data Bases

3.   COMPU-SERV NETWORK, INC.

o   Description

     Compu-Serv Network provides data processing services on a remote
     computing basis to industrial, financial, insurance and governmental
     organizations through a national network serving 31 metropolitan
     areas.

o   Services Offered:

     -    Data Management

     Fast access to large data bases and simple yet flexible report
     generation capabilities assist management in controlling information.

     -    Finance and Econometric Analysis

     Financial analysis and planning, accounting, and banking applications
     (including a bond portfolio analysis system for municipal and
     government bonds) meet a full spectrum of needs.

     -    Operations Research

     Statistics, project management, a unique new nonlinear optimization
     model, and product formulation applications (including a sophisticated
     system which leads the researcher from experiment design through
     product optimization) provide O.R. capabilities.

     -    Graphics

     Interactive graphics capabilities including financial charts, CPM
     GANTT charts, and contour maps.

o   Financial Modeling Languages:

     -    KDAT

     A command language to allow access to the KEA data bases, which also
     includes printing and plotting commands. The language also allows
     the user to perform statistical analyses and econometric modeling.

     -    STATS

     A comprehensive statistical package allowing for such functions as
     regression and autocorrelation.

–   CUFFS

A financial forecasting language which allows users to simulate
company performance as represented by user-created models.

–   Data Bases Supported: NBER, KEA

INPUT

4.   DATA RESOURCES, INC.

●   Description:

DRI offers econometric consulting services by combining on-line
access to worldwide economic forecasts, data banks, models and
software with management and technical consulting, educational
programs and contract research to meet the particular needs of
each customer. DRI provides full language capabilities for remote
computing on their own Burroughs B7700.

●   Services Offered:

–   Corporate Planning

      ●   Forecasts product line demands
      ●   Develops budget and control models
      ●   Links corporate cash flows
      ●   Models the effects of investments

–   Regional Analysis

      ●   Models relationship of employment, housing, income,
            retail sales, etc.
      ●   Forecasts changes in regional conditions

–   Investment Analysis and Decisions

      ●   Inter-industry check on estimate consistency
      ●   Forecasts relative industry profitability
      ●   Identifies new industry profit opportunities
      ●   Models individual company sales and profits

–   Support for Economic Research Centers

      ●   On-line data
      ●   Model building and simulation
      ●   Training of researchers and students

–   Insurance

      ●   Forecasts growth, costs and profitability
      ●   Demand potential for commercial insurance
      ●   Demand potential for private lines by state
      ●   Forecasts policy loan demand
      ●   Models real estate and direct investments
      ●   Evaluates industry-by-industry profit outlook

- Banking

    - Industry-by-industry cash flows
    - Forecasts loans, deposits, other cash flows
    - Evaluates industry-by-industry profit outlook
    - Supports bank economics analyses
    - Models real estate and direct investments

- Marketing

    - Checks internal sales forecasts
    - Monitors sales performance
    - Projects long-term prospects for product lines
    - Analyzes special effects of promotional and advertising campaigns

- Financial Modeling Languages:

The Data Resources MODSIM program is a model simulator and report writer that both solves financial models and presents the results in camera-ready form. Typical uses include cash-flow analysis, asset/liability management and sales forecasting.

Models may be recursive, simultaneous or block recursive and can contain over 700 equations. Reports are user-designed and can perform selection and ranking routines.

    - Data Bases Supported:

    DRI, NBER, SPNB, ValueLine, Compustat, OECD, IMS

5. GENERAL ELECTRIC COMPANY
   Information Services Division (GEIS)

○ Description

General Electric Information Services Division, offers the Mark III
Remote Computing Service through an international data communications
network. The division has recently consolidated financial services.

○ Services Offered:

  ○ Mark III Service

    - Interactive Foreground Service

    - Remote Batch Background Service

○ Financial Modeling Languages:

The FAL II language permits financial analysts and planners to design
reports and analyses to their own specifications and business formats.
It offers extensive report formatting and editing options. Logic
design facilitates establishment of models. Capacity is big enough
to handle large management reporting systems, complex financial
caclulations, and sophisticated business models. Built-in capabilities
cut time and effort for calculating depreciation, present value, ROI,
amortization schedules, rolling forecasts, and consolidations.

FAL II permits easy linkage to other programs, data files, and
application packages for an integrated system. It facilitates
definition of logic and report formats as well as input and storage
of data.

○ Forecasting Services:

  - UCLA National Business Forecasting Service. The service will
    be available early in 1977. The model forecasts 300 variables,
    including price, employment, production and financial variables.
    The service will first be available in the form of printed
    forecasts plus forecast data base access. During the year, the
    full forecasting model will become available on a remote
    computing basis.

  - DIADEM. Econometric Models of foreign economies will be available
    through Economic Models Ltd. (England). The models will cover
    common market countries and Japan.

○ - Data Bases Supported:

    NBER, ValueLine, Telstat, IMS, NEMA, Compustat, AHAM, JBD

6.   INTERACTIVE DATA CORPORATION

o   Description

Interactive Data Corporation is a wholly owned subsidiary of
The Chase Manhattan Bank, N.A.

Interactive Data Corporation is a computer services organization
specializing in remote computing financial and economic data and
information processing services to financial institutions.

o   Services Offered:

    -   The most extensive financial and economic data bases available
        on-line.
    -   Applications languages for data management and analysis, report
        generation, and graphics.

o   Financial Modeling Language:

Equations for a model may be developed using statistical estimation
procedures in XSIM, such as regression analysis, or can be a priori
estimates or definitions. The system is capable of solving hundreds
of simultaneous nonlinear equations that can include discontinuities.

o   -   Data Bases Supported:

Chase, Merrill Lynch, ValueLine, Compustat

INPUT

7. NATIONAL CSS, INC.

● Description

National CSS is a leading RCS vendor, offering time-sharing services using IBM and Amdahl equipment.

● Services Offered:

Broad range of interactive and remote job entry applications for scientific and business data processing.

● Financial Modeling Languages:

EMS is a complete, interactive software facility for: managing transforming, and displaying economic and financial information; performing statistical analyses and estimating equations; and constructing and simulating econometric, corporate, and a variety of other models.

INFOTAB is a computer program specifically designed for the financial community to prepare tables used in financial plans, forecasts and analytical reports.

● - Data Bases Supported:

NBER, FDIC, EMS, Merrill Lynch

8. RAPIDATA, INC.

● Description

Rapidata is a remote access computer service company that offers
application packages, proprietary and public data bases, programming
services and data base management services. These services are
provided on Honeywell dual processor 437s, RAPIDTEN (DECsystems
1070 and 1980) and RAPID/370 (IBM 370/158), and are accessed on a
conversational or remote batch basis via RAPIDNET, a nationwide
network.

● Financial Modeling Languages:

FISCAL is a series of computer programs and financial routines for
developing financial models using simple English language statements.

The models describe the formats of the reports, the sources of data,
and the computations required to produce the reports.

PROBE is a generalized data management and analysis system which
is particularly well suited for the development of financial
management information systems. PROBE's wide range of built-in
forecasting, simulation, reporting and graphics capabilities provide a
powerful modeling tool for the Corporate Treasurer, Controller,
Manager of MIS, Corporate Planner or Economist.

● - Data Bases Supported:

NBER, FRBST, RAPIDQUOTE, ValueLine, IFS, BAMACS

INPUT

9. REMOTE COMPUTING CORPORATION

●   Description

    RCC offers systems for planning, analysis, network data bases, and
    for management reporting. The company's focus has centered on specific
    thrift industry applications, primarily services to savings and loan
    associations, mutual savings banks, the secondary mortgage market,
    and the securities and commodities markets.

●   Financial Modeling Languages:

    SLP: SLP projects cash flow, income, balance sheet results, loans,
    savings, liquidity and tax details from one month to ten years into
    the future for savings and loan associations.

    MSB: As with SLP, MSB is a complete and accurate representation
    of how funds flow through a savings bank from source to use.

    LMS: This portfolio accounting and management system provides
    comprehensive information in more than 40 reports which detail
    status, value and cash flow of all securities and bonds in a savings
    and loan association's portfolio.

    AMMINET: A national price quotation and news network operated for
    the Automated Mortgage Market Information Network, Inc.

●   -   Data Bases Supported:

        Merlin

INPU

10. THE SERVICE BUREAU COMPANY

● Description

A division of Control Data Corporation, previously an independent
subsidiary of IBM. Specializes in Business Applications on both
remote and batch bases.

● Services Offered:

CALL/370 Management Remote Computing Service. Major CALL/370
features include MINI-MIS, an interactive data base system used
for a broad range of applications involving inquiry, information
retrieval, reporting, and file maintenance; and PROPHIT II, a
financial modeling language.

SBC's CALL/PLUS Remote Computing Service, equipped with standard
IBM Operating System software, provides an integrated time-sharing
(TSO) and remote job entry capability.

● Financial Modeling Languages:

PROPHIT II is a comprehensive Planning/Analysis/Modeling/Reporting
system. The characteristics of PROPHIT II include:

- data base management

- data base access

- recursive modeling

- statistical analysis

- report formatting

● - Data Bases Supported:

NBER, Telestat, FDIC